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NEWS IN BRIEF

NEWSPAPER

City, County DP Links Up, Cuts Cost

MOBILE, Ala. — A joint computer project set up by the city and county governments has saved the taxpayers here about \$57,000 during the first nine months of operation.

The city had originally budgeted \$101,527 for its own data processing service and Mobile County allocated \$110,743 for its operation. But the county decided to buy its own computer, rather than rent, and the city contracted for time on the county computer, according to County Commission President Howard Yeager.

Personnel from both operations were combined so that the actual cost of equipment and expenses for the joint service was nearly \$57,000 less than the combined budget, he said.

Yeager said when the computer is completely paid for in about 18 months the county can expect to save an additional \$4,000 per month.

Certification Foundation Sets Organization Meeting

CHICAGO — The executive councils of the Association for Computing Machinery (ACM) and the Data Processing Management Association (DPMA) have approved participation on an organizing committee seeking to generate a final proposal for establishing a Computer Foundation. The committee will be cochaired by Fred H. Harris, director of the Computation Center, University of Chicago, and John K. Swearingen, CDP, vice-president and general manager of Environmental Research Corp., Las Vegas.

The concept of the foundation was approved recently by both ACM and DPMA. It originated out of recommendations made by the Certification and Testing Advisory Committee.

An open meeting will be held Jan. 17 at 10 a.m. in O'Hare Inn, Des Plaines, Ill., to discuss plans for the organizing period. Individuals as well as representatives of interested societies wishing to attend should contact Ms. Jamie Fox at Computer Foundation Organizing Committee, P.O. Box 1442, Chicago, Ill. 60690.

On the Inside This Week

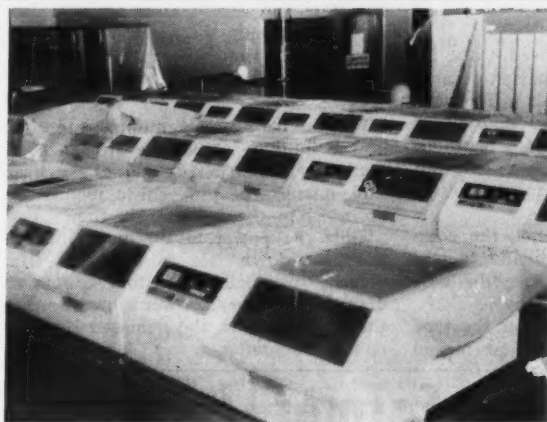
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Seen Residing in VS

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IBM Wins Battle
Over 'Secret' Papers

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Disk drives are shielded from any water damage.



(California Highway Patrol Photos)

Univac mainframes assume an air of secrecy at National Guard headquarters.

Water Damage Avoided

Plastic Protection Proves Worth in Fire

By Marvin Smalheiser

CW Correspondent

SACRAMENTO — A \$1,200 investment in plastic covers several months ago protected about \$15 million worth of computer equipment during a fire which ravaged the state headquarters of the California National Guard.

The equipment was on the second floor of the block-square building here which housed the Guard headquarters and the state Department of Motor Vehicles (DMV).

Ira Isbell, chief of the EDP Division of the DMV, said the plastic covers prevented any water damage. The equipment was up and fully operational within four days after the effort to preserve the files, he said.

The fire, discovered about 11:30 p.m. Christmas day, caused \$5 million damage in the 10-year-old building.

The DMV EDP Division is located in two buildings, the second across the street.

In the gutted building the equipment included a Univac Series 70/55 which controls and accesses all vehicle records in the state, and a Univac Series 70/6 in a multiprogramming mode that controls the name index with 35 million names, and serves as a cross index to both driver records and vehicle records.

Across the street are a Univac Series 70/45 that acts as a front-end communications processor and a Univac Series 70/55 to control the data base for all driver records.

Adjacent to the computer center in the building where the fire occurred is a large key-entry room with 200 CRT terminals and about 40 keypunch machines.

Isbell was called to the fire within a half

(Continued on Page 2)

Memory Path Like 40's

Accelerator Boosts 360/30

By Ronald A. Frank

Of the CW Staff

NEWTOWN, Pa. — Computer Hardware Consultants & Services Inc. has announced a hardware enhancement for 360/30 users to make their system operate at speeds comparable to the Model 40.

The 360/30 Accelerator feature doubles the memory "fetch" rate of the mainframe, decreases channel interference and alters the microprogramming to increase throughput.

The fetch rate is doubled from 1 byte/cycle to 2 byte/cycle with the accelerator. Asked whether this would actually double the throughput of the mainframe, a CHCS spokesman said actual increases "will be in the eyes of the beholder."

The decrease in channel interference means that faster peripherals will see a marked improvement in efficiency, a spokesman said. The Model 30 operates on a cycle steal principle, and using a priority scheme it services the slower I/O devices first. By eliminating the number of cycles that each channel needs, faster peripherals will perform more efficiently, a spokesman said. The net effect will be to drive I/O devices such as 1,100 line/min printers at rated speeds, he added.

By improving "all of the Model 30 microprogramming," some instructions will execute at "double the normal speed," the spokesman said.

While the accelerator feature "will not be all things to all people," it will be most significant for compute-bound Model 30 users, the spokesman said. However, an

I/O-bound 30 user will also see some improvement, he added.

"We are following right behind the 370/125," a CHCS spokesman said. "Everything the 125 can do, the Model 30 user will be able to do with real memory and the new [accelerator] features."

The hardware enhancement will require the Model 30 user to have at least 128K of storage. The present IBM memory

Spotlight on User's Lib

limit is 96K for the Model 30, the spokesman said.

Because of the major changes to the system, CHCS is assuming that IBM will not support 30s which have been upgraded with the accelerator. But CHCS will provide complete maintenance and diagnostics, the spokesman said, through its existing field force.

The device will be easy to install on any 30 and will be located on the backboard within the mainframe. It can be installed "over a weekend," the spokesman said. The accelerator is scheduled for first deliveries in April but initial installations will begin this month, the company said.

The accelerator will cost \$880/mo on a two-year lease. Purchase price will be about \$33,000. The feature will be available through all major leasing companies which have installed Model 30s, or direct from CHCS. The company is at 8 Pheasant Run, 18940.

Vendor Switch Involves IBM, User in Hassle

By Michael Weinstein

Of the CW Staff

WARWICK, R.I. — IBM is using "the resources available to the bureaucratic structure of a large corporation" in an attempt to dissuade a user from moving to another vendor, according to this city's DP director.

"These resources manifest themselves in a letter from IBM — submitted after it became known the city was contemplating switching mainframe sources — which implies local data processing personnel are not competent to decide on hardware selection," DP Director George Waterman said.

The letter, which found its way into the hands of local officials, suggested that no decisions be made until the city had time to improve certain areas of operation and formulate a long-range plan.

Looking Around

"Before we started looking at other sources for equipment, IBM had no com-

(Continued on Page 2)

Pick a computer,

360

It will pay you to investigate Ampex peripherals to extend the capabilities of your IBM 360 before considering the expense of stepping up to 370. Then, choose economically from the broadest line of peripherals in the industry.

Mainframe memory enhancement. For IBM models 22, 30, 40, 50, 65, and 67. ARM-22 expands the 360/22 to 64K; ARM-30 can expand the 360/30 to 128K; and ARM-40 can expand the 360/40 to 448K. The ARM-50 works to 1½ megabytes, and the ARM-2365 is designed for use with IBM models 360/65 and 67.

Mainframe-ECM. Equipped with a semiconductor cache memory, the standard ECM operates at the effective speed of the IBM 2365 mainframe memory. It is the most economical 1 to 8 megabyte replacement for the 2365. For the model 50, ECM still is available with a 2.5 microsecond cycle time.

Disks. Ampex Double Density Disks are today's most cost-effective technique for adding storage capacity . . . 233 megabytes in half the space or 466 megabytes in the same space as a 2314 system. No software changes under DOS or OS.

Tape drives. (Configurations to go with both IBM 360 and 370 systems. See next column.)

370

Economy, performance and reliability are the three most important reasons for selecting Ampex peripherals for your IBM 370.

Mainframe memory enhancement. For IBM 370 models 135, 145, 155 and 165. The ARM-135 and ARM-145, available soon, will be totally semiconductor memory enhancements reflecting the latest state of the art. ARM-3360 for models 155 and 165 currently are coming off the assembly line to provide as much memory as you need. Multiple units are installed at up to 40% savings to their users. Speed, interface and performance are identical to the IBM version.

On the near horizon, another Ampex breakthrough in semiconductor engineering—the ARM-158 and the ARM-168.

Disks. The new DS-330 subsystem to match the IBM 3330 has a capacity up to 1600 megabytes with 16 drives. This system, with complete plug-to-plug compatibility with IBM 370 systems, is faster and easier to change, and offers operators greater convenience.

360/370

Tape drives. Ampex pioneered tape and tape drives—and has led the industry in sophistication ever since. The TM-34/TC-38 is typical with totally compatible flexibility. The TM-34, replacing 3420, 2420 and 2401 tape drives, has all the advantages of IBM 3420 drives, including speeds up to 200 ips. The TC-38 controller is compatible with all future changes in IBM OS through controller microprogram updating without hardware changes . . . PLUS superior error-correction capability.

BUT THERE'S MORE COMING . . . A new super-space-saving tape subsystem with 4 tape drives in the same space as 2 standard tape drives.

Univac

Further proof that Ampex supplies the most complete line of peripherals is this sampling of products for UNIVAC 400 and 1100 users.

Mainframe memory enhancement. The ARM-1108 operates at the same speed and is completely compatible to 1108, 1106 and 494 systems operating with Exec 2, Exec 8 or OMEGA. Furthermore, this memory enhancement has a built in MMA to facilitate use in multi-processor environments. No minimum UNIVAC memory is required.

Disks. The Ampex DS-8430 disc subsystem is a high-performance alternative to either UNIVAC disc or drum systems. The DS-8430 has a radial interface to provide disc operation with proven FASTRAND software. This disc subsystem may also operate in a FASTRAND emulation mode, providing all the advantages of removable discs.

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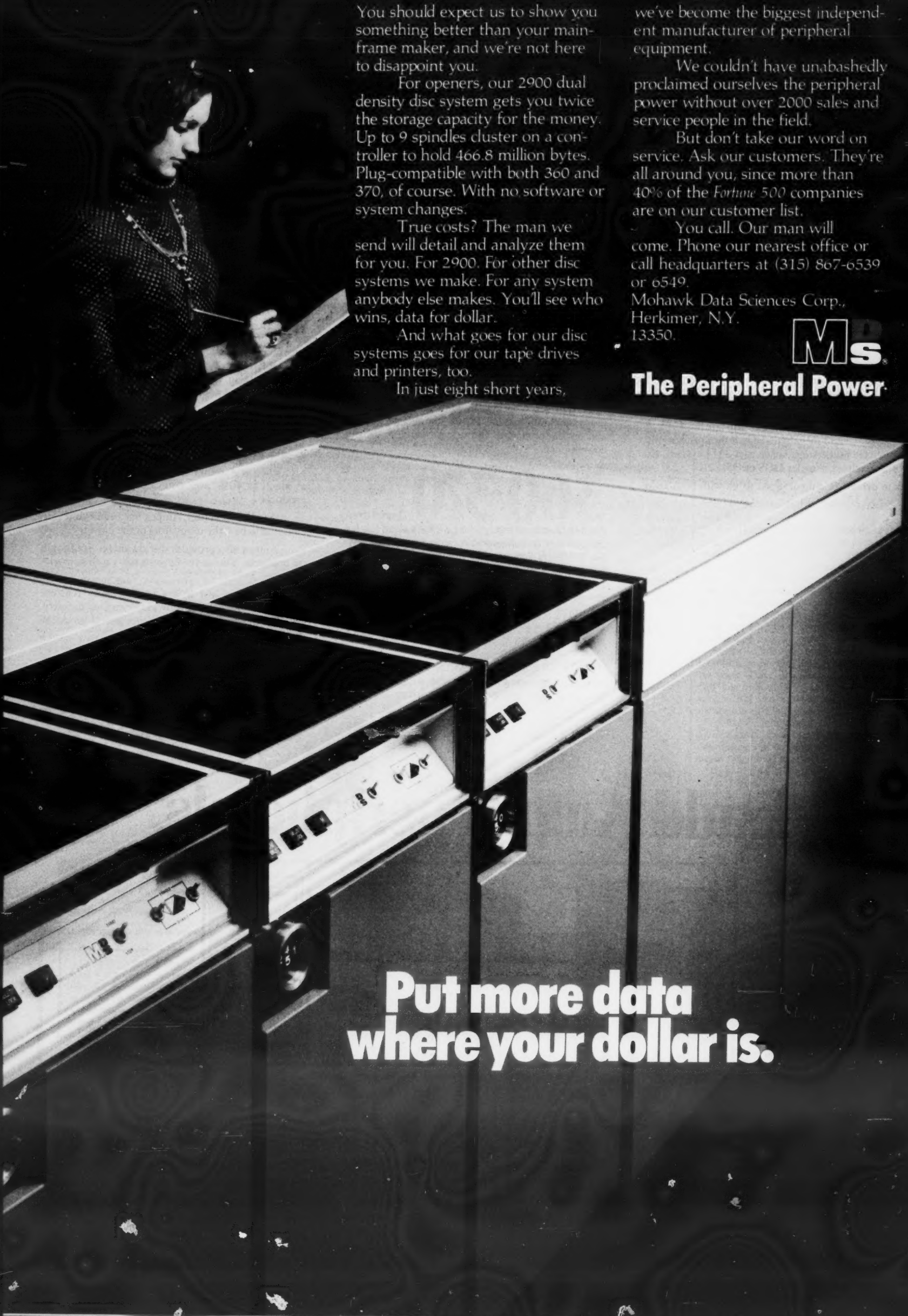
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Dead Man Still on Welfare Rolls

BOSTON — Sixty Massachusetts welfare checks totaling \$5,400 were sent to a man who has been dead since January 1970. The erroneous checks were blamed on the Welfare Department's computer system.

In addition, the checks were recently reported stolen from the home of the dead man's sister-in-law who said she called the department and asked them to

patterns as possible while avoiding the bad ones.

"The most exciting innovation is the creation of a chess pattern language which enables an expert chess player to give advice to the program without having to know how the program itself operates," he said.

Although "teaching" the computer to play chess as well as a master is a fascinating goal in itself, the USC research has more significant implications for the development of computer programming, Zobrist indicated.

"Many computer scientists, as well as science fiction writers, have predicted that computers of the future will learn in order to reach a human level of intelligence.

"This work raises the possibility that the learning will take the form of advice-taking, which we're exploring in our chess program. We should all hope that the computers do not receive bad advice," he said.

News Wrapup

stop sending the checks but "there they were in my mailbox, every two weeks." She said she never cashed any of the checks.

According to the Welfare Department, Irving Moore's case was closed two months after he was reported dead. But at that time several other cases were erroneously closed and when these cases were put back on the rolls, Moore's case was also reopened.

Massachusetts Welfare Commissioner Steven A. Minter called the mistake an "extraordinary case" that should not have happened. Payment on all the checks has been stopped and the department is checking for similar errors.

Registration System Adds Off-Highway Vehicles

LOS ANGELES — California's computerized Registry of Motor Vehicles has been expanded to include all types of off-highway vehicles.

The new service is an outgrowth of legislation effected last year which requires all vehicles used, such as trail bikes, dune buggies and snowmobiles, for recreation on public land to be registered with the Department of Motor Vehicles. The frame number and engine number of the vehicle are stored in a computer which aids the police in tracking stolen vehicles.

About 46,000 of the estimated one million off-highway vehicles have been registered.

The American Association of Motor Vehicle Administrators said California is the first state to offer such a program.

Gift Net Links Drugstores

MAHWAH, N.J. — Western Union Corp. is introducing a gift sales service to link drugstores in any of 48 states into a computerized network so they can guarantee cross-country delivery within hours.

The project, named Gift America, will include 15 to 25 brand-name items (at retail prices ranging from \$15 to \$35), which research has shown to be the products most often sent as gifts. Gift America is expected to be operational within a year, with an anticipated network of 6,000 dealers, according to its president, Charles O. Johnston.

Computers will assign each delivery automatically when the order is placed, to be delivered by the dealer serving that destination's Zip Code area. Further, each dealer's inventory will be automatically replenished via centralized computer control, Johnston said, and paperwork will be minimal.

Gift America headquarters are at 85 McKee Drive, 07430.

Chess Playing Moves Ahead

LOS ANGELES — Bobby Fischer, take notice. The computer is "learning" to play chess as it never has before, according to Drs. A.L. Zobrist and F.R. Carlson, assistant professors of electrical engineering and computer science at the University of Southern California.

They are developing a program which they claim will enable the computer to form a long-range game strategy by recognizing and evaluating patterns on the chess board. It can play another computer program or a human player.

Carlson explained that the USC program, after pattern recognition and evaluation, seeks to move into as many good

BBC Would Expand TV

LONDON — The British Broadcasting Corp. is planning to equip British televisions for use as read-only video display terminals.

Under the Ceefax plan — approved by the BBC's governors — home viewers will have a small keyboard from which they can choose 30 different services, including news flashes, continuous stock information and weather reports.

Any standard television set will be able to access a service with the addition of the keyboard unit — costing about \$250 — that will either be permanently attached to the TV or plugged into the electrical output.

The technology for Ceefax is already available and a prototype should be built by 1973 with full service starting in 1976, a BBC spokesman stated.

During normal hours of transmission the intent is to have "pages" of each service continually updated so that a user could key in any selected por-

tion — for example news — and spend the day watching page after page of text role across his TV screen.

Another feature would have keyboard units with storage capabilities so when the transmitter was shut down for the night viewers still would access the most recent "page" of data from each service.

A less expensive keyboard unit is being designed to allow only one service to be keyed into the viewer's home. Under this concept the viewer might see the news on the hour, stock reports on the half hour and cooking hints twice a day on a published schedule.

Future plans for the viewer include video cassettes to store information and an input capability so the viewer can access commercial services. For example, a producer might run his commercial and the viewer could buy the product by telephone directly from his home.

Did You Know?

One of a series MAKING IBM INSTALLATIONS WORK BETTER

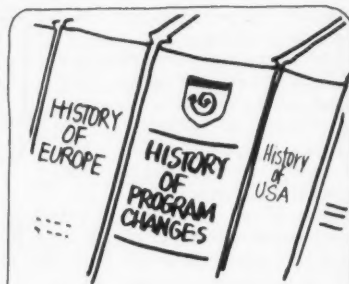
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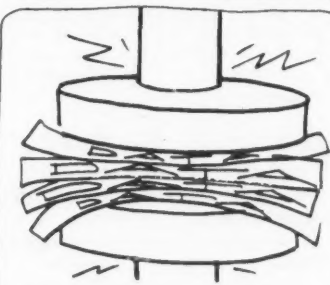
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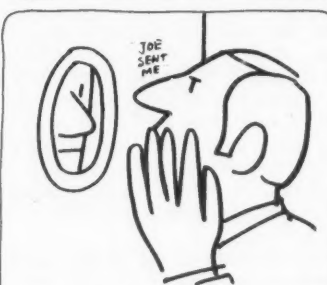
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Editorial

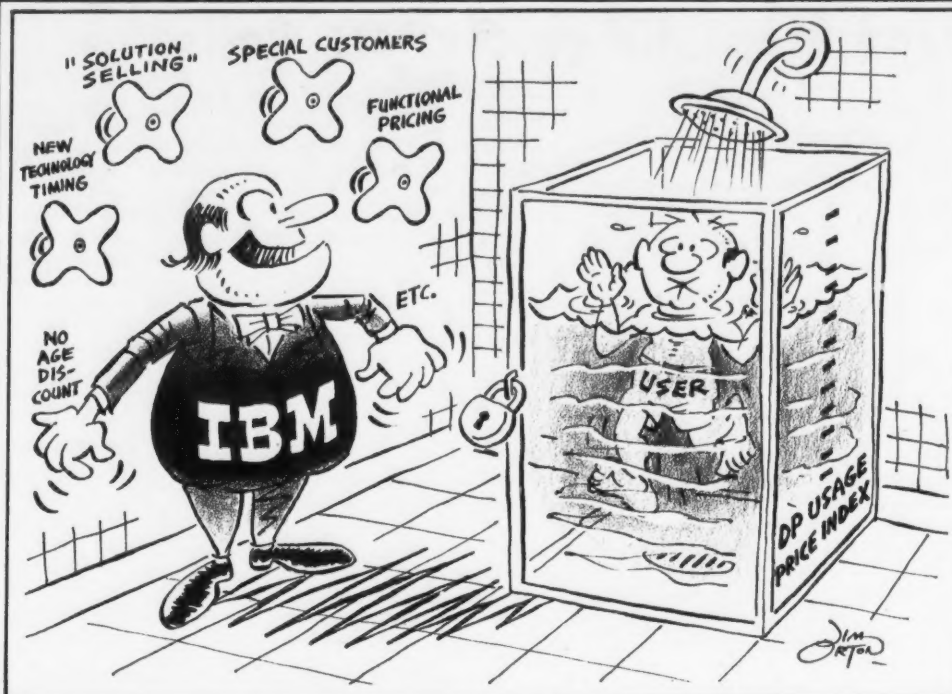
A Professional Responsibility

Only positive action on the part of computer users and others in the computer community can debunk the charge that computer people have traditionally failed as social activists.

Groups like the ACM and the DPMA should lead in the effort to translate the ideals expressed by many in the computer community who want to use their DP skills for the whole society.

While many social causes cannot be endorsed by everyone in the community, there is little disagreement over the need to clean the environment or train disadvantaged persons for meaningful careers.

With a central focus on society's problems the professional groups must show the way, thus emphasizing their responsibility to their members as well as the entire DP community.



'Deep Enough?'

A Complex Industry Demands Accurate Knowledge

By Bruce Gilchrist and Milton R. Wessel
Special to Computerworld

On Nov. 20 the U.S. Supreme Court handed down its first decision on a strictly computer-related issue. Specifically, the court ruled against the patentability of certain kinds of computer programs. Important as this particular ruling is, perhaps the greatest long-term significance lies in Justice William O. Douglas'

current Justice Department/IBM contest would be improved if the parties had access to the information derived from broad public hearings?

Sen. Philip Hart (D-Mich.), in his proposal for an industrial reorganization court, appears to be thinking along the same lines. More generally, a study of the government's involvement in the computer industry prompted us to recommend establishment of a Commission on the Computer Industry to conduct a two-year inquiry, and to recommend elsewhere that the Justice Department hold public hearings on the form of relief to be

sought in its case against IBM.

To be sure, all these proposals may be somewhat inconsistent with our tradition of having the Justice Department alone prosecute antitrust cases on behalf of the general public. But inroads have already begun to creep into that tradition, and the question to be considered is whether the complexity of the computer industry does not demand a modification in our ways of doing things.

Francis Bacon wrote, "Knowledge is power." Perhaps the best way the country can manage the computer industry and hence make sure it is used for the

public good is to make sure that knowledge of the industry is both reliable and widespread.

The computer is indeed a key tool of the growing knowledge industry. It would be ironic and possibly tragic if we get into difficulties because of our lack of knowledge about the computer industry.

Bruce Gilchrist and Milton R. Wessel are the authors of "Government Regulation of the Computer Industry" (Afips Press 1972). Gilchrist is executive director of the American Federation of Information Processing Societies, Inc. Wessel is a New York attorney.

Viewpoint

final paragraph where, in behalf of a unanimous court, he writes:

"If these programs are to be patentable, considerable problems are raised which only committees of Congress can manage, for broad powers of investigation are needed, including hearings which canvass the wide variety of views which those operating in this field entertain."

These words focus on a fundamental problem applicable to many aspects of the computer industry. It is not only a new but a very complex industry, which is difficult to deal with in terms of either established procedures or ways of thinking.

A computer program was simply not considered by the writers of our patent laws. Similarly, the framers of the antitrust laws had no concept of the relative inflexibility which the computer may be building into our economic structure or the ease with which information could be passed between companies by means of computer-controlled communications.

Investigation Needed

In suggesting that a broad congressional inquiry is necessary, Douglas is adding the weight of the Supreme Court to other suggestions that the time is ripe for some form of investigation.

While others perhaps have not been as specific as Douglas, the common concern is that decisions are being made about and within the computer industry which will undoubtedly have a major impact on our economic life but that these decisions are being made without adequate knowledge.

Antitrust is clearly a primary area of concern, and the confusion which has typified the discussions about what form of relief the Justice Department should seek in its current suit against IBM illustrates the difficulty of the problem.

If the Supreme Court feels the patenting of programming should be decided on the basis of extensive congressional hearings, doesn't it follow that the outcome of the

Letters to the Editor

Certificates Complementary

I have just finished reading Alan Taylor's column on "Attack on SDE Certification May Have Backfired" [CW, Dec. 13]. I must say that as a CDP holder and a member of DPMA, I agree with Taylor and am rather horrified at the attack to which he replied.

While I'm not certain the attack could be construed as unethical when matched against the Code of Ethics of the CDP holder, it is certainly unprofessional. Since Taylor is a fellow holder of the CDP, I believe he should make the name of Mr. X known to the rest of us so we might make appropriate requests to the Certification Council to have him removed and, possibly, if his comments are indeed unethical, have him stripped of his CDP.

I am at present undergoing the certification process by SDE and don't believe the two certificates are incompatible, but complementary.

Eugene T. Dolan, CDP
Assistant Professor

Federal City College
Washington, D.C.

Beware the Quack!

Alan Taylor's article on "Attack on SDE Certification . . ." and previous articles in *Computerworld* are my only sources of information on the examination for the Certificate in Data Education.

But, Taylor seems to point out the most serious flaw of that examination. He states: "The CDE is based on the concept that practitioners are entitled to certification if they cannot be proven ignorant or dangerous."

It seems to me that, for any examina-

tion, the burden of proof rests on the candidate. She or he must prove competence. That is true for journeyman plumbers, elementary school teachers and surgeons.

No less can be accepted from persons wishing to teach "data."

Adventitiously acquired ability sufficient to doubt ignorance is adequate for becoming a quack. Many universities offer formal courses leading to certification as teachers or "data" professionals.

Helmut E. Thiess
"AB, MBA, CDP"

Washington, D.C.

IBM Leads the Band

The Dec. 6 article entitled "Users Awaken to Security Needs" contains a major error.

The article states in the fourth paragraph:

"Examining the problem from new or different angles has become somewhat popular and the last to climb on the bandwagon was IBM, which last spring announced its long-term, \$40-million project to develop secure systems."

On the contrary, IBM started the bandwagon in November 1967, when it created a separate department exclusively concerned with customer data security. In addition, IBM has been building security provisions into its hardware for over two years. Just one example of this is the magnetic stripe card reader on terminals. There are numerous other examples.

Francis M. Carter
President

CTMS, Inc.
New York, N.Y.

Some DPers Take Plunge

On the front page of the Dec. 13 issue is

the headline "DPers 'Fail' Social Role." We would like to inform your readers that there are some DPers currently getting their hands dirty on a long-term basis with the United Farm Workers movement in California.

In the April 5 issue we explained how we had dissolved the paper jam that had developed in the union by bringing in several DP professionals (living on subsistence wages) to design and implement a data processing system.

They were successful in that project, and they did not cop out and return to their safe, middle-class existence and leave the union "holding the bugs." They are all still here maintaining the system and working on further applications.

David Smith
Director of Data Processing

United Farm Workers, AFL-CIO
Keene, Calif.

...From This Corner

I take exception to an article in the Nov. 29 *Computerworld* entitled "APL/Ascii Terminals Provide Graphics," in which Scientific Time Sharing is said to be one of the first companies offering APL Ascii support.

We are the first APL vendor to support Ascii at speeds of 10/15/30/60 and 120 char./sec. TSR has a number of applications in production for customers, using Ascii devices.

J.J. Weisenfeld
Vice-President, Marketing

TSR Inc.
Great Neck, N.Y.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

1973 Objective:

Let's Make DP a Recognized Profession

Recently Robert Sennet wrote that he had always feared my possession of the CDP had blinded me to the virtues of other data processing professionals who might not hold it [CW, Dec. 6]. Well, Robert, this first report of 1973 is for you — and for all others who are interested in improving the quality of data processing. And you do not have to fear what I am going to say — because it includes a forecast that data processing quality improvement is going to be greatly emphasized

The Taylor Report

By Alan Taylor, CDP



"I cannot see how votes can be meaningful unless they not only guide the (society) administration into certain positive acts, but also warn them away from other not so popular items." — Hamilton Armstrong Jr.

by CDPers and non-CDPers alike during 1973.

Naturally, I shall try to do my part in these columns, because my personal interests have always been in favor of really good data processing. I have perhaps overemphasized certification in the past because I believed it could be valuable in improving data processing. This belief has recently proven true, through the actions of the CDP holders who have formed the Society of Certified Data Processors (SCDP). They have now become a major force moving toward strong professional data processing standards.

In the two years since it was formed (at the instigation of a reader of this column), the SCDP has pioneered the development of standards for data bases, for constitutionally protected data and for other items.

It is working within the established groups and while it is still too soon to see the full effects of its work, the value of the trailblazing is obvious.

But this work would not have been performed, and its value would have been lost to the profession if the certification program had not existed to pull the members together.

Late in 1972 the SCDP discovered that interest in developing better standards for data processing was not unique to CDP holders who joined the SCDP — but is a major interest of most CDP holders, inside and outside the SCDP.

This interest was discovered when a large group of CDP holders was polled by SCDP Secretary Jerry Martin. He designed the questionnaire to leave the CDPers complete freedom to answer what they felt a CDP holders' organization should do.

The results showed most of the respondents were putting one aspect or another of improving the quality of data processing as being their prime professional interest.

Perhaps the most succinct, effective response came from Grover Rodich, CDP of Portland, Ore. He wrote "Prime Objective — establish DP as a recog-

nized profession." Only a few words, but plenty of meaning.

For while making DP a recognized profession certainly calls for some form of wide certification, it also requires a lot more than that. Professions do not get recognized — unless they have standards. For DP to become recognized therefore implies that standards of DP quality will have to be created.

And professions do not get recognized unless they both possess and enforce professional ethics that protect the public. These currently do not exist either, so to carry out Rodich's "prime objective," we will have to develop standards and arrange for their enforcement.

Now, I know the SCDP is listening to Rodich and the rest of the CDPers, because the SCDP is already at work studying these problems.

But the SCDP is only a small group. I find, however, that other groups, quite unconnected with the CDP, are getting equally concerned. This is all for the best, for professionalism is not the exclusive prerogative of any single society, certified or not.

The November newsletter of the Society of Professional Data Processors, for instance, held great promise of action for professional quality activism, and the SPDP is more representative of the data processing community than the SCDP. The SCDP will only admit practicing data processors and data processing instructors, which keeps out hardware salesmen, etc.

Like the CDP, the SPDP was counting ballots recently — to

determine what areas should be worked on in 1973. The results were surprising, because it was the ethical questions rather than the technical ones which came out on top of the voting. Codes of ethics, auditing, and DP standards were the first concerns, while committee work and Cobol languished at the bottom.

One particular item clearly gave SPDP President Hamilton Armstrong Jr. cause to think.

The question was how important are meaningful elections in a professional society. The response was that they are "vital." But how was this "motherhood" goal to be implemented? That was left to Armstrong!

I am glad to say that Arm-

GOAL-RANK 'Vital'		SHORT DESCRIPTION OF GOAL	UNWANTED %age Vote
1	75%	DP Umbrella Socy for Profs.	7%
2	70%	Create DP Audit Standards	0%
=3	65%	(Make Socy. Elections Meaningful) (Create Enforcable Ethical Code)	0%
5	60%	Provide Monthly Activity Report	0%
6	55%	Finance by Compatible Activities	0%
=7	45%	(Use Project-type SPDP Structure) (Provide Interpretive Reports)	4%
9	40%	Budget 60% Dues for Tech Rpts	10%
10	25%	(Urge More Users on Codasyl)	6%
		(Use SPDP 'Regional Convenors')	6%
		(Publish SPDP Register)	11%
		(Work at Cobol Liason)	10%
		(Work on Cobol Co-ord. Committee)	7%

The above table, taken from the November Monthly Activity Report of the Society of Professional Data Processors shows how members voted for 1973 projects. It can be seen that ethical subjects far surpassed technical ones, indicating 1973 may well see a welcome concentration upon making DP a recognized profession.

SPDP Enrollment Form

Please accept my application for membership. (Annual Dues — \$20) ☐

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strong's thinking does him and his society credit, for he appears to have taken steps to provide effective elections and real membership control.

Writing in the newsletter he suggested starting a tradition of "after-vote statements."

"These after-vote statements," he wrote, "I envisage being produced by the SPDP president immediately after any election

or vote. The statement will lay down his interpretation of what the results mean and of how they are going to govern his actions in the future.

"Subsequently," he continued, "such a statement can be used, where appropriate, against him!"

Armstrong explained what he expects to gain from these after-vote statements, and how he thinks they can make the members' votes really meaningful.

"The interpretation statements will therefore limit the authority of the [SPDP] president... I cannot see how votes can be meaningful unless they not merely guide the administration into certain positive acts, but also warn them away from other not so popular items."

That is the most professional statement from the president of any data processing society that I know of. I certainly commend both him and his members.

Moreover, let me suggest that if you are seriously concerned about making data processing the profession it deserves to be — (and if you are actually in data processing practice or teaching) — why don't you join the SPDP?

A coupon is attached. Filling it in will help Rodich, Armstrong and myself attain our 1973 objectives for data processing.

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DOSRELO

DOSRELO provides a method of making DOS problem programs self-relocating. DOSRELO accomplishes the self-relocation capability for all programs, regardless of the language, by adding entry point logic to the object code of the program before the Linkage Editor catalogs it on the Core Image Library.

CIMS

The Computer Installation Management System (CIMS) provides a method to supply management with pertinent information in the utilization of their data processing hardware. CIMS accepts data collected by the System Management Facility (SMF), formats the data and presents the data in varying sequences and formats. Reports for job accounting, multi-programming throughput, hardware analysis, and others are provided.

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Random Notes

As Many as 1,000 Variables Modeled With GE's 'PA300'

BETHESDA, Md. — A probabilistic analysis program (PA300), just implemented on the General Electric remote-computing network, provides business managers with a modeling tool that evaluates all important parameters rather than just one best alternative.

PA300 is able to handle 1,000 variables, 500 of which can be probabilistic, a GE spokesman said. Minimum and maximum impact of variables can be determined. Both single and multivariate sensitivity analyses can be run.

'FDR' Enhanced to Dump 9 Disks Sequentially or Concurrently

FLANDERS, N.J. — Users of Version 1.4 of the Fast Dump Restore (FDR) package from Innovation Data Processing can handle serial dumping of from one to nine 2314-type disks in 65K in one OS job step. Concurrent dump of as many as nine disks can also be done in one OS job step, with an additional 60K needed for each additional concurrent operation, the company said.

Improved diagnostics pinpoint physical errors such as invalid VTOC information, invalid count fields and nonstandard zero records while dumping. The \$99 FDR can be ordered through P.O. Drawer F, 14 Cloverhill Drive, 07836.

'Dmars' Works With Data Bases

WALTHAM, Mass. — Subscribers of the First Data Corp. time-sharing service can now use the Data Management and Retrieval System (Dmars) which features a report generator, a user-oriented command language and random access file processing. With Dmars, users can define, modify, retrieve and update data bases.

Dmars can search for items by comparing data base fields with numeric values, or with specified text strings on a complete match or a "contains string" basis. Dmars may be used to create subfiles pertinent to a following application. First Data said from 400 Totten Pond Road, 02154.

'Magic' Optimizes Circuits

DALLAS, Texas — The Modern Analytical Generator of Improved Circuits (Magic) general purpose electronic circuit optimization program, is now available through the Univac 1108 centers of the University Computing Co. time-sharing network.

Developed by Scientific System Technology, Inc., also of Dallas, Magic allows the user to specify a circuit and set of element values, after which the computer calculates the circuit responses. In optimization mode, the user also specifies the desired response and the system adjusts the elements to best meet that objective.

Staff, Tools, Approach

System Evaluation Must Be Planned

By Don Leavitt
Of the CW Staff

SADDLE BROOK, N.J. — System performance evaluation has a definable dollar value, but who should do the evaluation and what tools should be used are questions each installation must answer for itself, David Vitek, manager of computer systems support for State Farm Insurance Co., said here recently.

His company saw a need for "some sort of measurement effort," Vitek said, as plans progressed to shift much of the policy inquiry and updating work from 25 "more or less independent" regional DP centers to a centralized site.

The shift involved a changeover from batch-oriented programs written in Autocoder and run on 360/30s and 40s in emulation mode, to pseudo-"real time" programs, largely in PL/I, to be run on 370/165s, with 360/30s used as "intelligent terminals" out in the regional offices.

If present plans are completed, the 165s, located at corporate headquarters in Bloomington, Ill., will be linked together in a quadriplex configuration. The company also has a pair of 155s in Bloomington, for home office use, Vitek noted at a Boole & Babbage User Group meeting.

Faced with such a drastic change, State Farm began to explore all sorts of measurement tools — hardware and software monitors, simulators and program performance evaluators. A study indicated the company might save .8% of DP expenses/analyst/tool used and, perhaps ironically, it might be easier to cost-justify two rather than just one analyst.

Two Measurement Teams

Following a well-structured strategy that moved from an original definition of

objectives, through a feasibility study and reports to management, into development and implementation of a measurement group, the company now has four types of tools and eight analysts divided into two teams.

Each of the team members has become strong in the use of a particular tool, but project leadership rotates among them to enhance all their skills. Normally one plans the project, another installs the proposed changes and a third evaluates the results. The fourth member adds his expertise where it will do the most good, Vitek said.

The technical support group, including the measurement teams, has the same status as programming and operations, and leaders of each group report to the same vice-president. There is therefore no built-in "clout" due to organizational position, Vitek noted, and recommendations have to be backed by strong evidence before they are considered.

State Farm uses a mix of packages and

devices from a range of vendors. The company acquired the Supermon software monitor from the Cosmic clearing-house, and the Paces package from Pace Applied Technology to extract and summarize statistics accumulated by IBM's SMF.

The company also uses two versions of Lambda's Efficiency Analysis Program (Leap) from Lambda Corp. — one geared to system analysis, and the other for individual programs and instructions within programs. Leap works well with "standard" PL/I programs, Vitek said, but is not too good with output from the PL/I Optimizing Compiler now available from IBM.

Applied Data Research's System Analysis Machine (Sam), actually a software package, has been used for simulation of proposed hardware configurations.

The teams have used IBM's System Measurement Instrument, and Xray from Tesdata Corp., but have not yet made a final choice of hardware monitor.

'Data Analyzer' Gains Library And Linkage to 'Total' Files

NANUET, N.Y. — The Data Analyzer retrieval/reporting system from Program Products Inc. (PPI) has been enhanced by a procedure library feature which permits sets of user statements to be cataloged and accessed later through CALLs imbedded in other programs.

Stored procedures can include substitution parameters to be supplied in the CALL, and elements of the procedure can be included or omitted conditionally, PPI sources said.

The basic Data Analyzer can create bar graphs, histograms and cross-tabulations

without special programming. The package also provides the DOS or OS/360 user with computational capabilities for statistical functions, with table lookup and label writing support.

In addition to the procedure library feature, available without cost to all Data Analyzer installations, PPI is also introducing a separately priced Data Base Interface Language (DBIL) which currently allows the user to link up with the Total data base management system from Cincom Systems, Cincinnati.

The interface makes it possible for Total users to retrieve information from any combination of data sets within a Total data base, and to combine a Total data base with any non-Total files, PPI claimed.

Defining a Total data base to the Data Analyzer is comparable to defining a standard file, the company said, with additional information needed to describe the relationships of data sets within the data base and record types within a variable entry file.

DBIL, providing a series of simplified commands, permits the user to define precisely the method of accessing a set of master or variable files for a particular application or set of applications.

The Data Analyzer uses a 40K partition under DOS/360, or a minimum of 80K under OS. The DBIL module will utilize between 10K and 15K additional bytes, depending on the size of the data base being handled, a spokesman said.

Data Analyzer costs \$15,000. The DBIL logic is available for \$4,000, from PPI at 20 Turnpike Road, 10954.

Module Shapes Expense Spread

SAN DIEGO, Calif. — An allocation module introduced by Infonational that distributes expense items throughout an organization can be used in stand-alone mode, though it is principally intended for use with the company's general ledger and report writer systems.

The module logic is customized at run-time for each usage and can be applied to a single expense, such as a telephone bill, or to the expenses of an entire cost center, such as corporate overhead, Infonational said. It is parameter-driven so the user defines the input, the target accounts to which it is to be distributed, and the priorities and percentages.

Used with the general ledger system, the allocation processing would normally take place between the basic data gathering and the posting operations. Already designed to isolate "out-of-control" situa-

tions that need corrective action, the ledger system with the allocation logic added can pinpoint the bad situations even more precisely than before, the firm said.

The report writer system, like many others, is geared to helping the non-DP professional prepare his own reports. Again, the allocation logic of the new module would enable him to develop reports in more detail than would be possible with the undistributed data, Infonational said.

The allocation module functions under either DOS or OS/360 environments within 32K bytes of storage. It will operate along with available versions of Infonational's general ledger system, on Burroughs B2500/3500, Honeywell 200 and NCR Century 200 systems as well.

The new module is available for \$1,500, from 620 C St., 92101.

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DOS Mortgage Run Fits in 24K

DETROIT — Banks with a minimum 24K partitions under DOS can implement a full mortgage servicing and general ledger accounting system, including up to 60 periodic reports, with the Mortgage System (MS) software developed by Ft. Wayne Mortgage Co.

MS supports multi-branch operations and attacks what a Ft. Wayne spokesman called one of the prime expenses in mortgage banking — postage costs. The system generates books of payment coupons which are sent to mortgagees a year in advance, rather than producing individual monthly notices of payments due.

Delinquency notices are sent to mortgagees, and corresponding reports given the bank's collection department, if payments are not received when due. Monthly reports to collection include a breakout of accounts that are 30-, 60- or 90-days overdue, the company noted.

18 Cash Reports

When payments are received, MS distributes the funds into principal repayment, interest and escrow accounts. Some 18 separate reports are produced daily to monitor the cash flow, the spokesman said. Money in escrow can be assigned to several purposes, even within a single mortgage account, he added.

The system generates payments of real estate taxes for each mortgagee, based on funds in his escrow account and on receipt of the tax bill from the relevant municipality. MS also notifies

the bank management when insurance renewals are required and can be adapted to generate premium payments, if the mortgagee has an escrow balance for that purpose.

In addition to reports for the mortgagee and bank management, MS also produces reports in compliance with Federal National Mortgage Association regulations, the company said.

The package is written in Cobol and requires four disk drives in addition to the 24K bytes of memory. MS sells for \$7,500 including source code, program listings and user documentation. Expenses for on-site support by Ft. Wayne personnel must be paid by the purchaser, the company said.

Ft. Wayne Mortgage is in the First National Bldg., 48226.

Compiler Output Moved To DOS Relocatable Library

PINOLE, Calif. — DOS/360 users can catalog compiler output directly in the relocatable library without punching object decks, using tape drives or coding Job Control Language (JCL) statements, with the low-cost Catalr software now available from Marcus Power Associates (MPA).

The \$99 package eases modular programming, the company said, by enabling programmers to compile individual modules and then link-edit the entire program from the library. Modularity will become especially important as DOS operations are implemented in a virtual storage environment with demand paging, a spokesman noted.

The package operates in conjunction with any standard languages. It copies language translator output from Syslink to the relocatable library, which may be a 2311, 2314 or 3330 direct access storage device. Control cards may be placed in the card

reader or preceding the object code on disk.

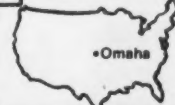
The Catalr package runs in about 20 seconds in any DOS partition that supports link-editing. It accepts the standard DOS Catalr card, and a pair of additional parameters that provide backup and modification-level maintenance.

The new entries allow the user to tag an incoming module by date and version number so that proven modules cannot be inadvertently overlaid, for example, by a revision. Without this protection, the user would lose his backup in the event the new version was faulty, MPA said.

Catalr may be ordered in object form by sending a check or money order for \$99 to MPA, 2694 Doidge Ave., 94564. Source code and program logic will be available for an additional charge, the spokesman added.



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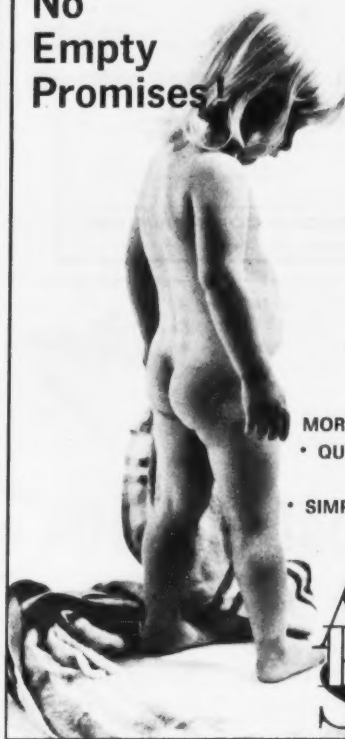
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Foreground/Background 'In'

Nova 800 Jumbo Also Gets Shared Disk

SOUTHBORO, Mass. — A Real-Time Disk Operating System (RDOS) from Data General Corp. can allow users to run concurrent fully protected foreground and background tasks in each of the two processors that make up the Nova 800 Jumbo computer system.

The new software, scheduled for delivery next spring, also supports shared disk operations, the company said, so data might be collected in foreground, for example, and then immediately processed in a background operation.

No Interference

In the protected mode, neither foreground nor background user can interfere with the other or with the operating system. On-line applications such as communications or process control can be run in the foreground while computations, report generation or program development tasks are being handled in the background.

With the disk software, which Data General considers a multiprocessing/multiprogramming package, both data and programs can be shared by the two processors. There is, therefore, no need to

maintain separate libraries and use of disk space can be optimized.

Backup System

The system also eliminates the need for separate peripherals for each processor, the company noted, and, from a different perspective, includes a built-in backup computer if a malfunction occurs on either one.

RDOS also supports expanded memories with up to 128K words of core available in each of the processors. The addressing mechanism allows dynamic allocation of up to 31K words of memory to either or both the foreground and background users, and protection of RDOS-controlled peripherals against inadvertent addressing by user programs.

To function, RDOS requires installation of the hardwired memory management subsystem which is mounted on a single printed circuit board. It costs \$3,500 and will be available in the spring.

RDOS itself will be distributed free, Data General said from corporate headquarters on Route 9, 01772.



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GA Package Includes Improved Fortran IV

ANAHEIM, Calif. — Under the Real Time Operating System (RTOS-16), newly available from General Automation Inc. (GA) the company's SPC-16 mini-computer will execute scheduled and interactive programs in a foreground mode concurrent with operation of batch programs in the background.

This means, the company said, that a user could be running time-shared Basic work while simultaneously compiling, editing, debugging or executing Fortran programs, utilizing system resources that might otherwise be idle.

RTOS-16 will run on any SPC-16 configuration, including the smallest one allowable for program generation: 16K of memory, a disk unit and a teletypewriter.

GA's multi-user Basic is described as a complete implementation of standard Dartmouth Basic, including matrix, alphanumeric strings and file-handling capabilities.

An extended version of ANS Fortran IV is also available, incorporating additional features to make more efficient use of the mini's capabilities with few if any changes in programs being transferred from earlier GA operating systems or from other machines.

RTOS-16 is being distributed free to current and future users of the SPC-16 minis, GA said from 1055 S.E. St., 92805.

Varatek Software Drives Process Control PDP-11s

BEDFORD, Mass. — Data acquisition operations can be handled in a multitasking environment on DEC PDP-11 equipment with the DOS-M package from Varatek Computer Systems Inc. Used in conjunction with DEC's standard DOS-11, the new software allows concurrent execution of many foreground tasks along with a single background task.

The foreground tasks are normally event-driven routines working from sensors or other acquisition equipment. The background task supports a control terminal utilizing a command language identical to the one supplied by DEC for single-tasking operations.

Both foreground and background tasks have full file-handling capabilities available on both file-structured and non-file-structured devices. The foreground tasks have file access but no terminal access in the present implementation, Varatek said.

In effect, this means that data captured by each of the foreground tasks can be posted to individual files or other data structures even though no processing is done at the time of acquisition.

DOS-M is available for \$3,500, from 1 deAngelo Drive, 01730.

Data Briefs

Communications Interface Added to OCR Scanner

MOORESTOWN, N.J. — Orbital Systems Inc. has added a communications interface to its Orbit/2 OCR scanner.

The scanner can read handprinted characters, pencil marks or punched holes, and with the interface can transmit the scanned data at 110-, 300-, or 1,200 bit/sec. The communications capability turns the scanner into a source data-entry terminal, the company said.

The interface can be added to installed units for \$700. The complete scanner with interface costs \$2,495 from Church & Fellowship Roads, 08057.

Modem Replaces Bell 103F

SUNNYVALE, Calif. — Anderson Jacobson Inc. has an L 184/12 modem to directly replace the Bell 103F data set.

The unit operates in the answer mode over 2-wire private lines and interfaces with standard RS 232-type terminals.

Pushbutton switches allow testing of the equipment and the line. Unlike the Bell data set, the independent unit provides both half- and full-duplex transmission. The modem costs \$190 or \$9/mo with first deliveries scheduled for early 1973. The company is at 1065 Morse Ave., 94086.

Portable Unit Has Ascii

NEW HAVEN, Conn. — Mite Corp. offers a portable data terminal that can operate at 10- or 15 char./sec over a dial-up line using an acoustically coupled phone.

The device can generate the full 128-character Ascii set and print 64 characters. The unit includes an impact printer that can handle up to six-part forms.

Called the 150T, the terminal costs \$2,100 from 446 Blake St., 06515.

NCR Adds Cassettes

DAYTON, Ohio — NCR has added a cassette capability to its thermal printing terminal. Called the 260-6, the unit includes a cassette storage of 2,000 80-character blocks and operates at 300 word/min.

Messages can be keyed in, stored on cassettes and left for later dial-up polling by a central CPU, NCR said. The terminal costs \$150/mo with first deliveries in June.

Communications Meeting Planned

SAN JOSE, Calif. — The second annual Computer Communications Conference at California State University (CSU), scheduled Jan. 24 and 25, will explore the communications aspects of time-sharing systems.

Information is available from Dr. E.K. Shaw, 125 S. Seventh St., 94303.

User Benefits Seen

Access Methods Could Reside in VS

By Ronald A. Frank
Of the CW Staff

WHITE PLAINS, N.Y. — The addition of virtual-storage concepts will give the teleprocessing (TP) user increased operational flexibilities, Robert M. King, IBM's product manager for large systems, told *Computerworld* in a recent interview.

Such an addition to a communications system may mean that the user can move his TP access method such as Btam, Qtam, etc. out of main storage and into his virtual environment, King said. "If you are going to page your TP access method in and out, you are going to have to pay a penalty of paging. But if that gets to be an intolerable situation, the system can freeze all of the TP access method in memory."

Less Dedication

For the low-volume TP user, virtual storage might make the difference between having a communications capability and not being able to handle this type of job, King said. "It will be easier to justify the low-volume application because less of the system will have to be dedicated to it," he added.

With the TP access residing in virtual storage instead of main memory, the access methods might well become more sophisticated and detailed, but this is strictly conjecture at this point, King said. "As the data processing community begins to exploit virtual storage with its techniques, this type of development certainly becomes possible," he said.

"The remote user has always been subject to the applications programs that exist at the central site. And since virtual storage allows these applications to be more completely implemented, the remote user will get better service," he said. And the central site will be able to offer these increased capabilities without disrupting normal operations, King predicted.

More Complete Implementation

Thus, one of the biggest advantages for the remote TP user lies in the possibility of more complete implementation of the applications and in being able to run unusual jobs that previously may not have had sufficient priority in a more conventional communications environment.

"Now the engineer who once a year runs a 500-by-500 matrix inversion and needs a 2 Mbyte region, can get it," King said. This type of remote user previously could not get on the system because of fixed-size partitions, and the fact that no one at the central site could justify the expense of setting this up on a low-volume basis, he explained.

Additional Channels

But increased central-site capabilities may require additional network capabilities, he said. While a virtual system may be able to handle a larger number of TP jobs, additional channel and I/O capabilities might have to be included by the user, he said.

By managing smaller portions of his program (pages) rather than regions, the user will be able to perform "deeper" multiprogramming and handle more on-line tasks in the CPU concurrently, King said.

Testing Easier

The testing of new applications programs for an on-line system will be easier in a virtual-storage environment, King said. As an example, a 512K 145 could be used to test programs that would later be run on a 2 Mbyte 165. The entire application could be tested on the 145 even though the performance on the smaller system might not be equal, he said.

And since the virtual environment "is more dynamic, the user can get more frequent test shots," King said.

Most large users that convert to virtual-storage capability will already have some TP operations, King said. And these systems will be enhanced with the increased flexibility which the new operating systems provide, he said. This in turn will make it easier to expand the communications functions, he said.

As a final point, King said virtual systems used in on-line applications provide the user with easier backup since small systems (512K) can be made to "look like" large systems (2 Mbytes) — making it less of a problem to switch a different system into the network. But such a switch to an alternate mainframe would still require a manual switchover, he said.

Turnkey Teleswitcher Runs Message Network

MILWAUKEE — Although a store-and-forward message-switching system usually requires customized software, some users prefer to get this capability on a turnkey basis.

For a company without extensive in-house capability configuring a message-switching network can be a real problem. One firm solved this problem by selecting a turnkey system.

Loewi & Co. Inc., an investment banking firm, serves its customers by entering large volumes of orders direct to the floors of various stock exchanges. To handle the 47 teletypewriters used by the firm's various offices, Loewi installed a Teleswitcher system from Computer Control Systems Inc. (CCS).

First Things First

The Teleswitcher acts as a controller for the TTYs and assigns priority status to messages determining in what order they will be sent. Before installing its own system, Loewi depended on a store-and-forward system operated by a correspondent broker, according to Terry Watts, manager of order processing.

Whenever a part of the system went down, Loewi would have to arrange for maintenance through the correspondent which controlled the system, Watts said.

With the in-house Teleswitcher, the company has "complete control," Watts said.

To Floor in Minute

The company uses Model 28 TTYs, according to Treasurer Bill Sullivan. With the Teleswitcher and 83 B3 lines from the telephone company, messages can be transmitted to the floor of an exchange in less than a minute, Sullivan said. The messages are transmitted at 100 word/min using 15 half-duplex teletypewriter circuits. Each message is in contention for available circuits depending on priority.

At present the Teleswitcher store-and-forward system is self-contained. The company also has a 360/30 which could be connected on-line to the Teleswitcher. But any administrative data that is accumulated by the front end is key-punched and entered off-line into the mainframe. If the company decides to connect the two processors, CCS can also provide that capability on a turnkey

basis, Sullivan said.

The complete Teleswitcher installation cost the company about \$100,000, according to Watts. Because Loewi avoided the configuration of the system in-house and also achieved closer control over its order-entry system, the firm feels it was worth the cost, Watts said.

Custom Job

The Teleswitcher is based on a DEC PDP-8 which is customized with software and the necessary peripherals to operate in the Loewi network. The firm considered two other front ends, according to Watts, and based on the two-year rental costs of the other systems, it was decided the company would be better off buying its Teleswitcher.

Although used primarily to execute buy-and-sell orders, for securities received from branch offices, the Teleswitcher system also transmits sales messages and handles administrative traffic between Loewi offices. The front end maintains a log of all messages and also provides management with reports and trends of network activities.

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'Our Service Offerings Based On Needs of Users': MCI Head

By Ronald A. Frank
Of the CW Staff

CHICAGO — "All our service offerings are based on the specific needs of users and we are always looking for additional input from our customers."

This is how John Goeken, president of MCI Communications Corp., reviewed the first year's operations of MCI at an anniversary meeting for 16 of the new carrier's initial users.

Tracing the long regulatory fight to begin service, Goeken said most of the 21 different digital channel bandwidths now available between Chicago and St. Louis were selected based on user's needs. He cited one large publishing company which wanted to transmit data in one direction to its regional printing plants. "This is what led us to offer one-way service," Goeken said.

The specialized carrier will begin to serve users between Chicago and New York in July 1973, according to John DiGregorio, MCI national account representative. About 51 tower sites have to be constructed along the New York route and almost half of these are already in place, DiGregorio said.

The equipment for each site is being preassembled in Dallas and each tower building and its equipment are transported into place either by truck or by helicopter, he said.

In addition to New York, MCI will inaugurate service to Philadelphia, Cleveland, Pittsburgh, Toledo, Detroit and Akron by the middle of 1973, according to Carl Voder Bruegge, senior vice-president.

By the end of the year service will be added in Baltimore, Washington, Minneapolis, Milwaukee, Dallas and Fort Worth, he said. And West Coast cities including Los Angeles and San Francisco will have MCI facilities in the first quarter

of 1974, Voder Bruegge estimated.

In 1975, MCI plans to begin satellite service, DiGregorio said. The advantages of this service for users will be that a one-to-many capability will allow a single transmission to reach several U.S.



CW Photo by Ronald A. Frank
John Goeken, MCI president, addresses users.

locations simultaneously. And costs for satellite service will not be geared to distance, he said.

Elaborating on the satellite plans, Alex Buchan, president of MCI Lockheed Corp., said FCC approval is expected soon for a joint undertaking with Comsat. If approval is granted, a new company called Spacecom may be formed.

While satellite service will be a valuable addition to terrestrial communications links, users will probably take these facilities pretty much for granted, Buchan said. "The user is interested in meeting his application. The end result is important regardless of how the information is transmitted," he said.

An MCI user group formed along industry lines may be one result of the recent meeting, according to an MCI spokesman. Although the company is not actively advocating such a group, it would receive support if initiated by users, he said.

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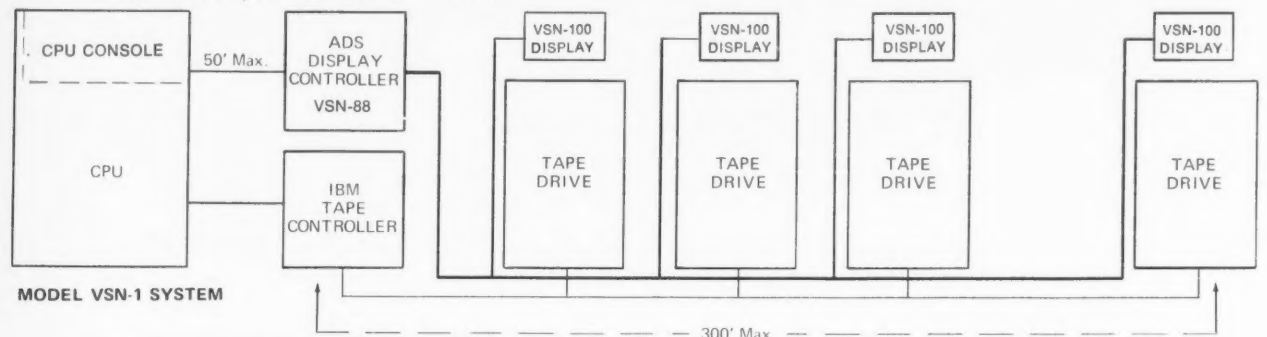
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The ADS Volume Serial Number Display (VSN Display), operating under OS control, tells the operator the 6-digit Volume Serial Number of a tape reel to be mounted. The VSN Display attaches to the Operator's Panel of any IBM Model 2420 or 3420 Magnetic Tape Drive or equivalent.

When a Mount Message occurs, a push-button indicator on the VSN Display flashes to attract the operator's attention. Simultaneously, the Volume Serial Number of the tape reel to be mounted on that drive is indicated by the display. The indicator will flash until the operator depresses the push-button light.

As illustrated, all displays are connected to an ADS-supplied controller, which in turn is directly hard-wired to the IBM Computer Console channel bus.



INSTALLATION AND MAINTENANCE

The VSN displays and controller can be installed in one day, by factory-trained personnel. Cable is routed under the raised floor from the VSN system controller to the tape drive and externally up the back of the drive along the hinged side of the swing-out access door. A separate hardware maintenance contract is available from ADS on a time and material basis.

ADVANTAGES

- Reduces human error by providing a more positive identification of the tapes to be mounted.
- Eliminates the need for a console printer or equivalent in the tape drive area just for displaying Mount Messages.
- Eliminates voice communications between the CPU console operator and the tape drive area.
- Improves operator response time to tape mounts.
- Allows the operator to carry more tapes for faster servicing of tape drives.
- Reduces computer room noise and confusion.

DISPLAY CHARACTER SIZE

Model	Description	Character Height
VSN-100	6 Character Numeric	0.75"
VSN-300	6 Character Alphanumeric	0.75"
VSN-400	16 Character Alphanumeric	0.4"
VSN-88	Display Controller (includes console connection capable of driving up to 64 displays)	

NOTE: 6, 16 and 32 alphanumeric character displays are also available for interfacing with other CPU main frames and minicomputers. The flashing light will extinguish automatically when the tape mount is satisfied, provided a communication interface controller Model VSN-99 is used.

A typical VSN system serving 8 tape drives, consisting of 8 VSN-100 displays and one (1) VSN-88 Controller, is presently priced at \$166 per month or a purchase value of \$4,960.

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Access Bank Data Bases

Portable Terminals Replace TTYs

NEWTON, Mass. — The use of portable terminals for data retrieval is growing within the banking industry. Many banks are acquiring portable units as replacements for the more bulky, less flexible teletypewriter.

The portable terminals used by banks fall into two categories: those that remain in-house and are useful from the standpoint of mobility and those taken outside by bank personnel. The latter type provides remote access to the bank's mainframe system wherever a phone can be acoustically coupled to a portable terminal.

The Chemical Bank in New York has established transatlantic data links with portable terminals accessing data bases in Cleveland on the GE time-sharing system. The bank uses Execuport terminals from Computer Transceiver Systems Inc. They are connected to U.S. CPUs from various sites in Western Europe including the UK, France and Germany, according to Ruth Wallestad, a senior consultant for financial studies at Chemical Bank.

The bank has developed corporate forecasting packages which are maintained on the GE system. The packages are designed to complement local accounting practices used by corporations in Europe. The data models on which the forecasts are based are stored on the GE CPUs in Cleveland. With the portable terminal, a Chemical Bank representative can produce projected income statements, balance sheets and other financial reports for a prospective client in Europe.

Own Data Base

The bank has developed the software for the corporate forecasts and GE provides the line facilities and the CPU power to generate the results. "To make your assumptions to derive your financial reports you have to create your own data base," Wallestad said. The use of the data models for forecasting purposes is leased to corporations by the bank, she explained.

The Execuport terminal has been used for financial demonstrations both in this country and abroad and the only problems have occurred in the U.S. in areas served by independent phone companies, she said. The portable terminal originally was not set up to handle non-Western Electric telephones, but this problem has now been solved with an adapter, she added.

"With some customers, the immediate financial printout generated with the portable terminal is 'the selling point,'" Wallestad said. "They want to see it in action."

IDCMA Approves AT&T Protection Proposal

WASHINGTON, D.C. — AT&T's plan for protection of private lines [CW, Nov. 22] using non-carrier equipment has drawn a "conditional" approval from the Independent Data Communications Manufacturers Association (IDCMA).

In a letter to the FCC, Arthur Carr, IDCMA vice-president, said the association would not oppose the proposal with the understanding that "protective devices are an interim approach that will not prejudice" any future certification program.

The only proper approach for a final solution to the interconnection question is one in which the user may utilize "either carrier or customer-provided equipment with the same line service," Carr said.

IDCMA is approving the AT&T plan with the understanding that the carrier will not "engineer" private lines with the proposed protective measures in such a way that they make it more difficult for the installation of independent data equipment, the letter said.

Private line protection is "an interim solution" pending settlement of interconnection issues before the FCC, Carr said.

Another bank which utilizes portable terminals, but for a different purpose is the Beverly Bancorporation in Chicago. The bank currently has about 60 terminals connected to an IBM 370/145 which is used to retrieve loan account data and similar day-to-day operations within the bank, according to Dino Kapadia, manager of research and planning.

Less Connect Time

A recent survey by Kapadia's department showed the Texas Instrument portable 720 terminals had about 36% less CPU connect time per month than another bank which was using teletypewriters.

The main reason for the increased efficiency, according to Kapadia, was the faster 30 char./sec transmissions on the TI portable terminals compared with the 10 char./sec on the Model 33 TTYs. Two banks with similar operating procedures were compared for the survey, he said.

From a practical standpoint, Beverly Bancorporation likes the portable units because they are easy to shift around among workers as needed.

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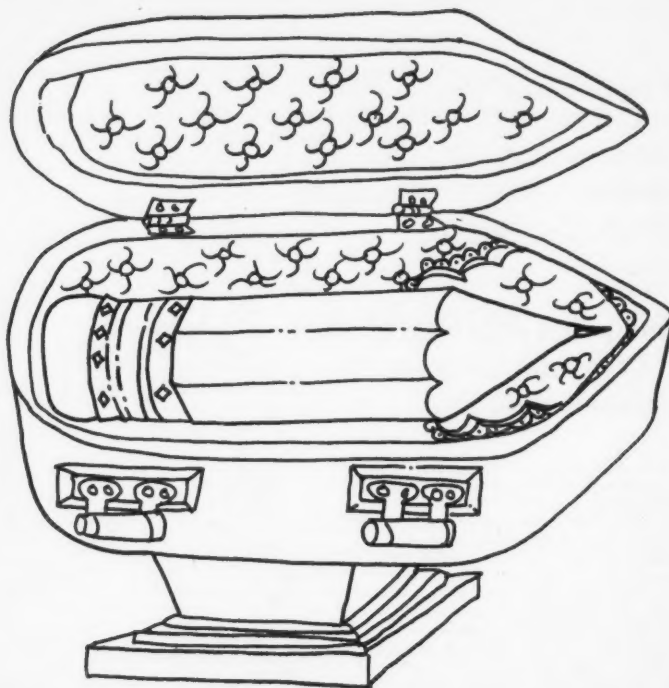
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Bits & Pieces

IBM Users Offered Add-On Memories for Large 360s

WAPPINGER FALLS, N.Y. — IBM System 360/65, 360/75 and 360/67 users now have new add-on or replacement memory, according to the developer, Internorm Corp.

The Series 70 memory system provides 256K to 1,024K bytes of 750-nsec memory and up to 4M bytes attachable to an IBM 360/65 the firm stated.

The system features a built-in off-line test unit and an all-modular construction including plug-in boards for both memory and logic.

Successful installation of the Series 70 has already been accomplished, a spokesman noted.

Prices for add-on start at \$84,000 for the 256K unit and increase to \$198,000 for the 1M-byte unit.

A lease plan is available and service is through Comma Corp. Delivery is within 60 days from Market St., 12590.

Camera Captures CRT Images

MAHWAH, N.J. — For users who need to take high-resolution photographs of terminal-display images Celco offers the COF/FIC Camera Display System.

The camera system — with a basic price of \$7,500 — is self-contained and attaches directly to the front of the CRT. The camera is electronically controlled and includes a through-the-lens light-metering system. Light transmitted through a film negative can also be detected by the optical-scanning back.

Standard models I, II and III — 16mm, 1,000 TV lines; 35mm, 2,000 TV lines; 70mm, 4000 TV lines — are available. Custom systems require six months for delivery from 70 Constantine Dr., 07430.

Sprinkler Turns Off After Fire

PROVIDENCE, R.I. — A sprinkler head is designed to automatically shut off after extinguishing a fire, according to a spokesman for Grinnell Fire Protection Systems.

The Aquamatic operates by means of a heat-sensitive disk in the sprinkler with each head operating independently so water is directed only at the point of the fire, the spokesman stated.

Typical computer room installation of the Aquamatic system costs about \$1 per square foot, from 10 Dorrance St., 02903.

Unit Aids Headline Writers

MIDLAND PARK, N.J. — A computerized character counter which will provide a readout of character units to 1/100th of a pica is available for headline writers from Terminal Equipment Corp. The Kara-Kount consists of an IBM Selectric equipped with a Holmes-Tycom transmit-only applique and a digital computer, and costs \$2,960 from 214 Franklin Ave. 07432.

Links PDP-11, PDP-15

DEC Offers Dual-Processor System

By Michael Weinstein
Of the CW Staff

MAYNARD, Mass. — Digital Equipment Corp. has taken its medium-size PDP-15, connected it to a PDP-11 through a multiplexer and the Unibus and come up with the PDP-15/76 dual-processing system.

The design objective of this system is to have the larger PDP-15 perform the large processing tasks while the PDP-11 handles administrative and peripheral tasks, a DEC spokesman stated.

A further advantage to DEC users, he stated, is that the PDP-11 has more compatible peripheral devices so the 15/76 system can be configured in more user-oriented versions.

Also unveiled with the new system is the RK15 disk cartridge system enabling present PDP-15 users to upgrade to the 15/76.

Second Processor

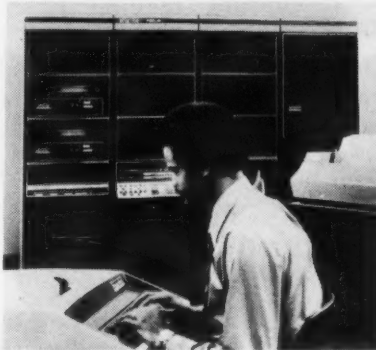
The heart of the new system is the Unibus — part of the basic PDP-11 configuration — which provides the PDP-15 with a second general-purpose processor and a second high-speed I/O data transfer bus.

The standard unibus is an 18-bit data pathway permitting transfer of 18-bit PDP-15 words, the spokesman stated, in addition to 16-bit PDP-11 words or two 8-bit bytes.

With the Unibus is a memory multi-

plexer, designed to emulate byte operation in the PDP-15 memory so memory is usable for PDP-11 programs, and to enable byte-oriented devices to make data transfers directly to the common memory in the PDP-15.

The RK15 consists of the Unichannel-15 peripheral processor — a PDP-11/05 with 4K 16-bit words of core memory, a



PDP-15/76 performs full parallel processing.

memory multiplexer enabling the PDP-11 and PDP-15 to share the 18-bit core memory of the 15 and an interrupt link for interprocessor communications — a disk memory controller and 12M-word disk drive.

The PDP-15 portion of the system in-

cludes paper tape reader, 16K words of core memory and magnetic tape unit.

Three Operating Systems

Three software operating systems are offered with the PDP-15/76 including DOS-15 — a disk-operating system; BOS-15 — a batch-operating system; and RSX-plus — a real-time resource-sharing executive.

Prices for the 15/76 start at \$64,300 with the RK15 costing \$18,900. First deliveries are set for March.

PGL Interfaces 844 Disk System With HIS Units

CHERRY HILL, N.J. — Users of Honeywell models 400, 600 and 6000 processors can now interface with the PGL 844 Disk System through a new model of the 844 Universal Controller from Peripherals General Inc. (PGL).

The 844-1 Controller connects directly to the CPU operating as a replacement for GE DSS 160 or 180 Series removable storage subsystems, the firm stated.

Standard and Double Density

Two disk drive models are offered: a standard density unit with storage capacity of 31.2M char./spindle; and a double-density unit.

A nine spindle 741 system has a capacity around 250M char. The same configuration using 742 drives stores near 500M char., a spokesman stated.

Access time is seven msec track to track, with an average random-access time of 29 msec.

A typical five-spindle system with Honeywell interface leases for \$2,500/mo on a two-year lease. This compares with \$3,300/mo for the standard Honeywell units, the spokesman said.

Delivery is 60 days from Cherry Hill Industrial Park, 08003.



PGL disk subsystem connects directly to Honeywell CPU.

Lower-Cost Units Added to Line Of Tape and Cassette Equipment

WALTHAM, Mass. — Kybe Corp. has beefed up the low end of its line of cassette tape products and management systems with a tape-management system, a cassette reader and separate writer and a line of cassette tape.

The TMS-77 is the third and lowest-priced of Kybe's tape management systems combining the functions of com-



TMS-77 is designed for the small- to medium-sized user with simple testing requirements.

puter magnetic tape testing, cleaning and precision winding, a firm spokesman said.

Innovations include an electronic motion control that eliminates "cinching" in the tape reel and a digital printout device for presenting test results, the spokesman stated.

The Ky-reader and Ky-writer are additions to the firm's line of cassette tape systems, operationally acting like a paper tape reader or paper tape punch, respectively.

Industrial Applications

These units are especially designed for users in the areas of numerical control, data logging and industrial applications, the spokesman said.

Kysette Red Label is called a lower-priced cassette tape for the user who does not need the superior performance of premium lines.

Unit cost of the TMS-77 ranges from \$6,200 to \$6,800. Prices for the Ky-reader and Ky-writer range from \$2,200 to \$2,600 in single units. Cost of the Kysette Red Label is \$4.75 in 100-unit quantities.

The firm is at 132 Calvary St., 02154.



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We show a history of making the printers that make money for EDP centers through off-line printing. You should see our System/4000 Satellite Printer do it. It interprets mainframe print format instructions, and processes 7- and 9-track tapes of from 200 to 1600 bpi densities at up to 1340 lpm. Get the System/4000 with a FACT controller to handle multiple-format programs and data tables. Get it with an ACT controller to translate vertical-format and data-character sets from magnetic tape codes to printer action codes. Getting the just-right Satellite can be a profitable experience. Especially since we can beat any competitor's price. So get in touch.

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"TSM"—for Total Systems Measurement—is a new process in performance measurement technology. The Dynaprobe-8000/TSM Option means, in effect, the measurement of all basic host systems activity *simultaneously*. With one set of sensor probe attachments at the central processor.

TSM has been under development at COMRESS for several months to overcome a major technical/economic problem facing the hardware monitoring industry: the reliance on the electronic hardware counter as the basic method of data capture.

THE PROBLEM: In the traditional approach, a high-speed hardware counter is connected to the host system for each function to be measured.

If, for example, you wanted to measure "device (disk) busy", you would attach a small electronic sensing device called a "probe" to the disk unit itself, and the device busy signals would be physically read into the hardware counter.

The number of direct, simultaneous measurements you would be able to take would be limited to the number of hardware counters in the monitor—generally 16 to 32.

To get some idea of the severity of this limitation, take a typical 360/50 installation: to measure all concurrent

1000 measurements simultaneously.

CPU, channel and device activity—*by program*—you would need somewhere between 400 and 500 hardware counters. Or an investment approaching one-half million dollars in measurement equipment. For larger systems, the counter requirement could easily exceed 1000. Obviously, this investment is not feasible. There had to be a better way.

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Utility Augments Disk System With COM

HOUSTON — The Houston Lighting & Power Co. is using a microfilm retrieval system to replace nine million pages of computer printout, save space, provide better customer service and reduce costs by two thirds, according to O. C. Hennessy, manager of operational research.

The need for something better became evident when customers would call and ask for information on previous bills. "It took an uncomfortably long time to put the customer on hold, call another department, wait for them to locate records in binders along 140 feet of counters, write down the information and then

relay it back to the customer waiting on the phone," he continued.

To illustrate the scope of the problem, Hennessy said the company receives about 100,000 calls a month from customers wanting to know specific information on their utility bills. Of these, about 10,000 cannot be answered using on-line terminals connected to the firm's two IBM 370/165s.

'Horrendous' Amount

The amount of 3330 disk space required to keep a minimal amount of information about customers is "horrendous," he

continued.

"We keep on-line information on the last two months of power usage, bill and previous balance by customer, but most inquiries are of a special nature, such as those concerning a customer who moved."

With Varian Microfiche Retrieval/Display units, "we are able to visually display a complete history of any customer within 15 seconds of his call," he stated.

Besides providing better customer service, the microfiche system has ended the paper flood and is about "one-third as expensive as the paper record-

keeping method — each Varian microfiche reader costs about \$2,500."

Another advantage cited is that it previously took seven hours for an employee to burst, sort and file the paper output while the microfiche now is available every day at 9 a.m.

Also four printers were kept busy 24 hours a day just producing the paper records. With microfiche the need for impact printers is reduced by more than one-half, Hennessy stated.

\$245 Camera Unit Yields Hard Copy From CRT Images

SAN DIEGO — Users with an occasional need to produce hard copy from the screens of video display terminals are offered a \$245 unit from Integrated Controls.

Built around a Polaroid camera and light-screening hood, the Scope-Mate is designed for users not able to justify paying \$3,000 to \$4,000 for a facsimile device, the firm's spokesman stated.

The hood fits over the display screen with the hand-held camera to produce 3-1/4 in. by 4-1/4 in. black-and-white or color photos in about 15 seconds, the spokesman said.

One camera-hood unit can be used with several terminals — moving from one to the other as the need arises — without additional equipment costs, the spokesman said.

The Scope-Mate has the same operating specifications as Polaroid's CU5, the spokesman commented, but costs \$100 less.

The purchase price of the camera unit comes to about one month's rental fee for the typical facsimile unit, he said.

The firm is at 3045 Moore St., 92110.



Scope-Mate camera can be moved from terminal to terminal.

Textile Dyeing Lives

FOXBORO, Mass. — A computer-directed system to control textile dyeing operations has been introduced by Foxboro Co.

The Dye Control System simultaneously controls any combination of up to 30 dye machines. Machines controlled can be atmospheric pressure, jet, beam, package and package or beam with flow control.

Depending on applications, the system will justify itself economically with as few as eight machines, according to the firm.

Foxboro provides documentation, startup assistance, maintenance and service support with a typical system costing about \$150,000.

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Backup System Provides Non-Stop Power

MAHWAH, N.J. — Abex Corp. wanted to operate its IBM System 7 for an application that required continuous operation — day and night, seven days a week; but it first had to solve some costly and unforeseen power problems by installing its own power back-up system.

When the project was first started, it was felt that if electrical power was lost four times a year, the company could tolerate it, said Tim Flanagan, engineer of tests at Abex's research center.

When operation began, line problems were causing the machine to crash not four times a year, but several times a week.

Each time the System 7 crashed, memory was totally lost. Lengthy programs were lost in execution.

Armed with the records of frequent outages, Flanagan and Herb Lloyd, research center manager, paid a visit to the local utility company to compare records.

Lloyd asked for records on local power outages over the previous year and asked what the utility expected for the future.

He was surprised to find that the utility company only counted outages when systems were 'down' 15 minutes or more, Lloyd explained.

"At this point," Flanagan said, "we decided to invest in our own power supply system — something we could install at a cost of less than 1/10th that of the computer and yet have as its primary responsibility the maintenance and continuous power support to the system, regardless of transients, spikes or out-and-out power failures on the line."

A no-break-up uninterruptable power supply (UPS) system from Gould Inc. was recom-

mended and installed. Heart of the installation is a static inverter — used as one component in an overall standby power system consisting of a charger, a battery bank and the inverter.

The inverter carries the computer's electrical load at all times, regardless of whether problems exist or not. Under normal circumstances, the charger provides the input current to the inverter plus floating the battery bank or recharging it as necessary. The charger in turn is run from the standard AC line.

In the event of failure to the commercial AC line, the inverter continues to run on the battery for a 20 minute emergency operation time. This is adequate to allow for an orderly shutdown of the system with no memory loss, Flanagan stated.

In this mode of operation, as long as the charger is functioning properly, there is no drain on the batteries. Input current for the inverter is derived from the charger and does not flow through the battery.

Within the inverter, the oscillator provides the basic frequency (60 Hz \pm 0.5%) adjustable by a variable resistance control.

Standard invert-a-stat frequency is 60 Hz (50 Hz units can be supplied). By synchronizing the oscillator to an external signal or to those of other units, line synchronization can be obtained.

Inverters of the same rating may be added by utilizing a paralleling logic circuit, Flanagan said.

The SCR unit operates as a switching circuit with the silicon-controlled rectifiers triggered alternatively by the oscillator square wave output. Output of the inverter is another square wave with amplitude directly proportional to the input DC

voltage.

This is a standard circuit to which modifications have been made to provide more reliable commutation and important protective features for elimination of high transients and component burnout.

The regulating filter is a ferroresonant device which converts the square wave into a sine wave of low harmonic content (normally 5%) and regulates the voltage output (normally \pm 3%), and also provides overload and short-circuit protection.

"With the turnkey UPS system we're now using," Flanagan concluded, "we have more fail-safe performance. And transient protection — something we were never able to identify as a problem simply because we didn't have the monitoring equipment — is a solid bonus."

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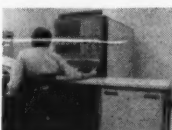
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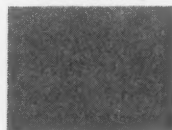
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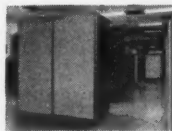
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PL/I Made More Useful Teaching Tool; 'Pluto' Speeds Compilation Process

As supplied by the manufacturer, PL/I is not economical for the university environment, due to lengthy compilation times. A teaching-oriented compiler must emphasize compilation speed, at the expense of execution speed. The University of Toronto has designed Pluto, a fast in-core PL/I compiler with a highly diagnostic interpreter for teaching most of the programming techniques possible with PL/I.

Tests comparing Pluto with PL/C showed they compile at similar rates, even though Pluto supports full PL/I while PL/C supports only a subset.

The Pluto compiler is a single pass (i.e. statement-at-a-time) high-speed compiler which translates from the PL/I source language to a pseudo-machine language. It consists of a number of reentrant modules.



**J. Daniel Couger
On
Education**

The pseudo-machine instruction set is large and includes some very powerful instructions. It provides not only for the computations required by Pluto, but also includes instructions which manipulate and control program flow and status information to allow extensive run-time diagnostic reporting.

The instructions are in three basic formats — single word, double word and multiple word. Most computational instructions have two operands — source and target/source, while I/O and other multiple-word instructions reference a variable number of operands (with an extremely large upper limit).

Performance of Pluto

The Pluto system (version 1) is now installed at the University of Toronto Computer Center and has been in use since September 1971.

The experience with the first-year course demonstrated the advantages of the Pluto system and provided an opportunity to make a number of realistic performance measurements. The existence of formal BNF grammars for the syntax has been

welcomed by the lecturers, either as a vehicle for original teaching of the language syntax or as backup to resolve syntactic details if a more conventional descriptive approach is taken in the lectures.

A main advantage is the diagnostic capability provided by the compiler/interpreter approach. The error messages are produced in-line wherever possible, and explicitly refer to context of the error, giving hints as to possible causes for this error where appropriate. Even more impressive is the information provided for execution time errors.

All possible information is given as to what variable is unassigned, whether there are other variables of different scope with the same name (namesakes), how the variable was originally declared and how control reached the statement where the error occurred.

Pluto execution speed is slow. However, it is quite acceptable for a student environment, and far exceeds the speeds normally associated with fully interpretive systems.

With the compiler and interpreter operating in an overlay mode, 150K of core provides adequate object space for student programs (Pluto object code is typically 1.5 times the size of code generated by PL/I-F for the same program).

A detailed description of Pluto was prepared for the June 1972, issue of *Infor* by P.I.P. Boulton and D.L. Jeanes of the University of Toronto. The publication is available from P.O. Box 2225, Station D, Ottawa, Ontario.

Couger is professor of computer and management science at the University of Colorado.

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ASM Film Catalog Aids User Training

CLEVELAND, Ohio — The *Systems Film Catalog*, published by the Association for Systems Management (ASM), lists nearly 150 films, from many sources, that could be used in conjunction with a user's training program.

The 60-page booklet divides the 16mm films into technical areas including basic DP concepts, flowcharting, systems applications and forms design. More general topics, ranging from "communications" and human relations, through management and work measurement and improvement, are also covered, ASM noted.

The catalog describes the contents of each film, its running time and whether it is in color or black-and-white. The sources and rental fees are also given, but a foreword warns users that the fees may not be current by the time they want to use a particular film.

The \$2 booklet is available from ASM headquarters, 24587 Bagley Road, 44138.

COMPUTER INDUSTRY

CI Notes

Scan-Data, Inforex Kill Merger Plans

NORRISTOWN, Pa. — Scan-Data and Inforex have canceled their previously announced plans to merge in order to form a data-entry company.

Scan-Data said the agreement was ended because "certain previously expected advantages of our combination now don't appear attainable."

The firms said they intend to resume discussions regarding possible OEM product purchase arrangements which had begun prior to the agreement in principle reached in December.

Unicomp Shakeout Victim

EL MONTE, Calif. — The shakeout in the mini business has claimed the Unicomp subsidiary of Hoffman Electronics Corp.

The subsidiary, founded in mid-1969, has never been profitable, according to Dr. Wendell B. Sell, Hoffman president. Originally Hoffman was a 31% investor in the firm, but took over 100% control two years ago.

"The competitive environment in the minicomputer field is so intense that we see no point in making the substantial investment required to penetrate that market," Sell said.

Ampex Lands IBM Pact

MARINA DEL REY, Calif. — Ampex will supply ATM-13 tape drives to IBM under a contract valued at over \$600,000 initially, but which may go as high as \$3 million.

IBM will use the units in the Data Processing Subsystem it is building for the U.S. Air Force Airborne Warning and Control System (Awacs) under a contract from the Boeing Co.

Supershorts

Informatics has gained exclusive U.S. and Canadian marketing rights to Quick-Draw, a proprietary software package developed by National Computer Analysts, Inc.

Turnkey Systems Inc. has appointed Hoskyns Systems Ltd. as distributor of its Task/Master telecommunications monitor in the UK. Teci-Software will serve the same role in France.

Four-Phase Systems Inc. has appointed Parvac Corp. Ltd. as exclusive Canadian sales representative.

Applied Data Research Inc. has registered the 2,500th sale of a proprietary package. There are 1,759 Autoflow systems in the field; 611 Librarian systems; and 102 Metacolib packages with the rest distributed among the remainder of the firm's line.

Computer Hardware Consultants & Services has received a Federal Supply Schedule contract that includes field service and core memory for upgrading 360/30s to 256K.

Inland Associates will sell the Computer Memories' (a division of Applied Magnetics) line of head-per-track disk memories to OEMs in the Midwest.

I/O Devices has signed a memorandum of understanding with Ricoh Co. of Tokyo, allowing Ricoh to purchase a 25% equity position in I/O. Ricoh will also have manufacturing rights to the I/O Model 100 printer on a world-wide basis under the agreement.

2 More Good Years Seen

'72 Mainframe Shipments Top \$9 Billion

By a CW Staff Writer

NEWTON, Mass. — "There's no doubt about it" — 1972 was one of the best years ever for mainframe computer shipments, according to International Data Corp., a computer industry research firm here.

Shipments by the mainframe computer makers during the year moved off the \$7 billion plus plateau and jumped to over \$9 billion, according to *EDP Industry Report*, a publication of the firm.

The total increase in worldwide shipments by the U.S. mainframe makers was up around 25%, the firm reported after an analysis of the preliminary figures.

The firm also reported that all evidence available "indicates that at least two more healthy, if not booming, years are in store for the computer industry," predicting a 15% yearly increase in the installed computer base for 1973 and 1974.

Like the Good Old Days

IBM, as expected, paced the growth

among U.S. computer manufacturers during 1972, a year that "will stack up as one of those growth years reminiscent of earlier times in the computer industry," the firm declared.

It noted, however, that "this is the first real growth year for computer shipments since 1968."

According to the firm's preliminary figures, which are subject to revision "as additional inputs are analyzed," IBM shipped equipment valued at \$6.11 billion during 1972, a 34% increase over the shipments in 1971.

The only single company in the top eight showing a higher percentage increase was mini-maker Digital Equipment Corp., whose shipments were up 45% over the 1971 figure at \$185 million.

Big Loser

The only big loser of the year was the RCA computer operation, with shipments of \$60 million, or 50% off the shipments registered the previous year. This was

expected, of course, since Univac took over the RCA base early in the year and began trying to shift customers to Univac machines.

Honeywell was third behind IBM and DEC in terms of shipment growth during the year, registering a 29% growth in 1972 over the 1971 figures. In all, Honeywell's shipments amounted to \$750 million.

Univac was close behind with shipments of \$420 million, a 26% increase over the previous year. Xerox managed a 17% increase in computer shipments, for a total value of \$50 million.

Control Data increased its shipments 12% during the year for a total of \$210 million. Burroughs and NCR were the only firms still in the mainframe business with less than a 10% gain in shipments. Burroughs, with shipments of \$405 million, was only 6% ahead of its shipment rate for 1971, while NCR was 5% ahead with shipments of \$195 million.

In the non-mainframe area, the manufacturers of IBM plug-compatible peripherals showed only a 1% increase in shipments during 1972 over the 1971 figure. The total 1972 shipments for this group were estimated at \$440 million, IDC said.

IBM's share of the 1972 shipments was put at 66.9% of the total, IDC indicated, easily allowing it to maintain its lead in the installed equipment base.

Trying Harder?

In the number two spot was Honeywell with 8.2% of the 1972 computer shipments, followed by Univac with 5.3% of the shipments during the year, when the shipments of RCA systems are accounted with the rest of the Univac shipments.

The independent IBM-compatible peripherals makers accounted for 4.8% of the shipments during the year, while Burroughs accounted for 4.4% of the dollar volume of shipments.

Following the leaders were Control Data with 2.3% of the 1972 shipment action; NCR with 2.1%; DEC with 2% of the total value; and Xerox with .5% of the total shipments.

"The bubble of oversell generated in the mid-to-late 1960s in the U.S. has finally been cleared from the pipeline," according to the firm, which indicated the "heavy wave of retirements has finally slowed as users begin to implement new and well-planned applications."

In addition, IDC indicated the importance of the overseas market to domestic computer producers will hold steady in the next few years compared to the past two, when it was a major contributor to corporate profits.

Guzy Plan: IBM Should Spread Its Wealth Around to Users

NEW YORK — IBM's excess capital should be made available to users so they can finance computer purchases, whether or not those computer purchases are from IBM or other manufacturers, according to James Guzy, executive vice-president of Memorex.

Speaking here recently, Guzy claimed the "availability of IBM credit to all users of computers would open up a new source of capital to finance the acquisition of data processing equipment."

"Perhaps an analogy could be drawn to the operation of the General Motors Acceptance Corp. or to the General Electric Credit Corp.," he added.

Pointing out that the industry has reached a position of considerable importance in the national economy, as well as the U.S. balance of payments status, Guzy noted the issue of whether the industry can prove itself viable by free enterprise or face government-imposed controls is a critical one.

"The problem of financing, not technology, retards the development of the DP industry," he stated.

"It is time that we cast aside the myth that a company's expansion is limited only by its ability to perform and get its product accepted in the marketplace," he said.

"Access to capital on reasonable terms is antecedent to these acts. We should recognize that our industry has come into a phase of its development when the concentration of capital and initiative within a small number of companies is working not only to impede the even growth of the industry at large but also contributes to an unhealthy public feeling that the economic life of the nation is after all dominated by a few," he noted.

"IBM has the only true capital surplus in the business. The balance of the industry operates with a capital deficit. On this exceptionally critical point, the often cited figures of total market size and comparative market shares mean very little," Guzy continued.

"While IBM can make a yearly half billion dollar distribution of funds to its shareholders, its competition is dependent on a continued flow of outside capital contributions for the growth of their operations," he said.

"The capital imbalance in our industry beggars the imagination. IBM pays out more in yearly dividends to its shareholders than the total capital which all its competitors are able to raise in a year,"

Guzy emphasized.

"Moreover, IBM retains an even greater amount in cash and liquid items because it cannot invest these excess funds to earn the same high rate of return that it has in the past," he said.

"I think it is a fundamental point that the result of adequate capital for our industry would be predictable savings to all computer users," Guzy asserted.

"Unquestionably, the many innovations outside IBM could, if properly financed, supply significant additional growth to the industry and great utility to the user," he continued.

Reinvest 'Excess' Lease Payments

Guzy proposes that "the so-called 'excess' lease payments — those beyond recovery of costs and after a contribution to profit — be reinvested in the industry to produce tangible benefits to the user community."

"The 'IBM credit window' . . . would be a major step in placing the burden of financing user acquisition of equipment where it more rightly belongs — that is, with the user and not with the manufacturer," he stressed.

But, he noted, "for a number of reasons it will likely require strong outside pressure to move IBM to activate these vast funds in a manner which is not prejudicial to competition."

IBM Wins One

Judge to Screen 'Private' Papers

NEW YORK — IBM recently won a battle with the government in its antitrust suit when a federal Court of Appeals struck down a pretrial order of Judge David Edelstein which would have allowed the Justice Department to use documents that IBM claimed were private.

The Court of appeals in a 2-to-1 decision ordered that "a judicial determination" of whether the documents were privileged would have to be made. So now a special judge will have to rule on each of the disputed 1,200 documents to determine whether Justice will be able to use them in its case.

In contention was the privacy of certain IBM records that had been turned over to Control Data and to the Justice Department in the pretrial proceedings in the two cases.

Under the early order calling on IBM to

produce the documents, the firm was given the right to retain those it felt were private or proprietary for one reason or another.

In the rush to produce the over 25 million documents that have so far been turned over in the case — documents said to weigh over 87 tons — IBM said it inadvertently let 1,200 of these documents slip through its censors.

The documents could be potentially embarrassing to the company and include the so-called Faw memorandum which discusses the reasons for IBM's price control in the market [CW Dec. 27/Jan. 3].

Edelstein had agreed with the Justice Department that these documents should be part of the case, claiming that since IBM had released them they were part of the public record.

Suppliers May Be Inhibited

Trade Secrets, Tax Issues Confuse Software Sector

This is the second in a series of articles dealing with the effect of the recent Supreme Court decision in the *Benson-Tabbot* patent case. In the first article [CW, Dec. 27/Jan. 3] attorney Roy N. Freed discussed the impact on users. Here, excerpted from a copyrighted paper, he discusses the effect on the software industry.

By Roy N. Freed, Esq.
Special to Computerworld

One would hope that the misconception of the Supreme Court will not be misapplied in

the trade-secret area to diminish that mode of protection. That result would be truly serious for the country by jeopardizing the viability of software suppliers.

We have not yet begun to utilize digital computers to any significant portion of their potential. Programs make that utilization possible.

The software business promises to have potential of almost unimaginable proportions and should not be inhibited by the threat of commercial piracy and the resulting inability to capi-

talize fully on the large investments in the engineering effort represented by program design.

Just when programs are characterized as merely ideas or mathematical formulae, efforts are being made to tax their owners substantially, particularly on the basis that they are tangible personal property.

Unfair Taxing?

Ironically, there is a great danger that taxing authorities will misconceive their true nature in ways opposite to the

Supreme Court and consequently tax their owners unfairly by attributing greater value to the tapes and other new media than is proper, based on long-standing principles of valuation.

It is essential to recognize for taxation purposes also that program creation is engineering effort resulting initially in design specifications for information-processing processes. Thereafter, products, such as magnetic tapes, are made utilizing those specifications in order to carry

out the processes so devised.

Those products must be valued carefully in light of the purposes of the engineering investment and by applying traditional principles to the actual facts. There are two key factors in valuation of magnetic tapes and related items.

First, it is necessary to recognize that the bulk of the engineering design expenditure is for the creation of a licensable or usable process rather than physical goods of the type that are marketable. Then, there is the new phenomenon that more than one copy of a magnetic tape is needed to make only a single use of the program process.

Not Equal

Hence, each tape "copy" should not be valued equally. Instead, it should be recognized that there is a primary tape for the use of a program process and also a number of satellite or supporting tapes to facilitate that use of the primary tape.

These approaches can be the key to sound and fair valuation, taken in conjunction with the fundamental distinction already suggested between the cost of the design engineering effort and the values of the resulting primary tapes created and marketed or used.

The cost of that effort attributable to the marketable tapes should be allocated among the total quantity of primary tapes expected to be produced.

Common Factors

Thus, there are important factors common to both the design of measures to protect proprietary programs and the application of sales and use taxes and tangible personal property taxes to the new types of property. The proper handling of the protection task might automatically achieve the fairest tax treatment for program marketers and users.

Since, as indicated, the marketing of programs properly involves both licensing of trade-secret processes and the distribution of tangible items (e.g., magnetic tapes) for performing those processes by means of digital computers, it is advisable to characterize those two components expressly in the business transactions in just those ways and to price each of them separately in the correct relationship that reflects their relative values, usually allocating the larger charge to the process license fee.

Grisanti Named Pertec 'Acting' President

LOS ANGELES — Frank A. Grisanti has been appointed "acting president" and chief executive officer of Pertec Corp., replacing Harold A. Kurth, as part of a compromise settlement of a proxy contest. The annual meeting will resume Jan. 30.

Kurth and Stuart Mabon, former director, remain employees of the company.

A new board of directors was selected, and the number of directors reduced from six to five. Re-elected were Donald F. Eldridge and Robert A. Kleist.

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Microdata Unveils Tape 6000 Transport

IRVINE, Calif. — The Microdata Tape 6000 transport offers file search and rewind speeds of 200 in./sec with instantaneous and long term tape speed variations of $\pm 1/2\%$.

The maximum data transfer rate is 72K char./sec (1,600 bit/in. at 45 in./sec). A dual gap read/write head and an erase head are standard with the drive.

The Microdata Tape 6000

New OEM Products

operates under any set of diagnostics, the firm said.

The unit uses 10 1/2 in. reels with direct drive motors and offers either 7 or 9 track systems. Price in OEM quantities is under \$3,000, from 17481 Red Hill Ave.

Tycom Unit Replaces IBM 735 I/O Writer

POMPTON LAKES, N.J. — Tycom Systems Corp. has unveiled the Model 73, a plug-for-plug replacement for the IBM 735 I/O writer which utilizes the Holmes Tycom baseplate and converts any standard IBM Selectric I or Selectric II into an I/O printer.

Orders & Installations

General Electric Co.'s Re-Entry and Environmental Systems Division has ordered a multiprocessor System 86 from Systems Engineering Laboratories, Inc. The unit will be linked with 12 environmental test chambers to acquire, process and display test data for aerospace hardware development programs.

Region IV Education Service Center, Houston, Texas, has purchased and installed a Control Data 6600 system to expand its administrative services and student instruction capabilities.

Irving Bank and Trust Co., Irving, Texas, has installed a Burroughs B3500 to handle check processing and internal applications as well as outside services.

The Times Publishing Co., St. Petersburg, Fla., has ordered two Honeywell 2000 and two Datnet/2000 front-end processors for both business and production tasks.

Castletons, Inc., a Salt Lake City retail chain, is installing Model 726 point of sale terminals made by the Sweda International Division of Litton Industries.

United Services Life Insurance Co. has leased an AU 100 Data Entry System from C3, Inc.

Northrup Corp.'s Aircraft Division, Hawthorne, Calif., has ordered a multi-mode interactive CRT display from Information Displays, Inc. The system will be used with Northrup's Large Amplitude Flight Simulator.

The U.S. Trust Co. of New York has purchased the Automated Tape Library Accounting System from GTE Data Services Inc.

The Sarasota County Board of County Commissioners (Fla.) is installing an NCR Century 200 which will be used by the sheriff, the board of tax assessors and for utility billing.

The Tycom system requires very little or no modification of the interface electronics already in use with the 24-volt correspondence-coded Model 735, the firm said.

Price of the Tycom Model 73 for OEM quantities is \$835 with delivery 45 to 60 days from 750 Hamburg Turnpike.

Infomag Positions Heads

GOLETA, Calif. — The Model 35 head positioning system for rotating disk drives with performance characteristics similar to the IBM 3330 has been announced by Infomag Magnetics Corp. (Infomag), 5743 Thornwood Drive.

The system produces a stroke length of 2.14 in. (constant force), with a total stroke of 3.80 in. Access times to within .0002 in. of final position are 3.5 msec for .005 in. stroke, 22 msec for one-third stroke and 40 msec for full stroke.

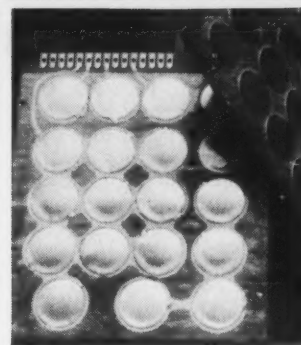
A "pancake" keyboard designed for use with personal, portable electronic machines, from hand-held computers to educational toys and teaching machines, has been introduced by Mohawk Data Sciences Corp., Herkimer, N.Y.

The thickness of new keyboard assembly is less than 1/10-in. Typical per station cost to the



Microdata Tape 6000
high volume user is 14 cents per station exclusive of cap. Delivery is 10 to 12 weeks.

An MOS/LSI Asynchronous



MDS Pancake Keyboard

Receiver/Transmitter, capable of half- or full duplex operation from Western Digital Corp., Newport Beach, Calif., can be programmed to transmit 1.5 stop bits.

Some IBM 360 users have chosen to upgrade their existing systems rather than jump into a 370. Many others still face this important decision. And if you're in that position, our January 31st Supplement will be a big help.

Supplement Editor Ron Frank has talked to users who have upgraded, and he'll report on their experiences and problems. Cost factors will be analyzed, and there will be a survey of the various tools now available for upgrading a 360, including:

- Independent main memories
- Faster peripherals
- D.A.T. Boxes
- Independent software

If you're a 360-user, you'll find a lot to think about in this supplement. And if you have a product or service which can up a 360, you should be advertising in this special supplement. Your Computerworld representative can give you all the details. Or call Judy Milford at (617) 332-5606

**On January 31st,
Computerworld shows
"How to upgrade
your 360."**



Univac Pronounces '72 'One of the Best'

BLUE BELL, Pa. — For Univac, 1972 was "one of the best fiscal years in the division's history," according to Gerald G. Probst, president of the Sperry Rand Corp. division.

"Revenues are better than 30% higher for the first 11 months of 1972 over the comparable period last year," he noted, adding: "Our bookings for commercial products are also running about 30% higher for the same period."

The good showings, he said, were primarily "due to the renewed strength of the U.S. economy which continues to recover from the recession."

"We are finding that the economy's increasing strength is instilling greater confidence in users with the result that they are accelerating computer acquisitions and implementing decisions that were postponed during the recession," he added.

Growth Abroad

In addition, he said, the continuing market growth in Europe and Japan is "encouraging," but he warned that "it is impossible to forecast" the possible effects of European discussions relating to a combined computer operation between the UK, France and West Germany.

"Naturally we would be concerned if any proposals for trade barriers limiting U.S. exports of computers should be erected," he stated.

"Conversely," he added, "we believe that our own domestic market should be open to non-U.S. manufacturers in the spirit of free, competitive trading."

In the past year, Probst said the acquisition of the RCA customer base has "continued to be highly successful. The rate of retention of this customer base is over 90%," he noted.

In the future, he said, with the U.S. shifting its resources away from the defense area toward "coping with domestic social-economic needs, we expect to see a strong demand for our computer systems in the state

and local government area.

"At the same time we look forward to controlled growth in the defense sector as the Armed Forces, faced with the high costs of an all-volunteer force, seek to utilize more automation as a way of reducing expenses."

Probst also predicted increased business in the areas of special technology systems, such as those used in air traffic control operations.

Executive Corner

■ Walter R. Oreamuno, chairman of the board, has been named chief executive officer and chairman of the Management Assistance Inc. (MAI) executive committee, succeeding Jorge M. Gonzalez.

■ Richard J. Elkus has been elected chairman of the board of directors of Ampex Corp.

■ W.F. Goodyear has been appointed vice-president, Nasdaq system at Bunker Ramo Corp.'s Information Products Division. He will be responsible for planning and implementation of new enhancements to the automated stock quotation system.

■ William Rennie and Harold Proctor have been appointed Eastern and Western vice-president, respectively, of Potter Data Products Service, Inc.

■ Martin L. Cohen has been appointed vice-president and general manager of International Teleprinter Corp., a subsidiary of The Singer Co.

■ Robert G. Clark and George A. Reed have been elected to the board of directors of Data 100 Corp.

■ E.W. Green has been named president of Intercon Systems. James M. Shrode becomes chairman of the board.

■ Roger L. Buiten has rejoined Ann Arbor Computer Corp. as vice-president and marketing manager.

■ Burroughs Corp. named three new vice-presidents: Edward W. Schening, manufacturing, corporate staff; Fitz R. Caudle, field marketing, International Group; and William TenBrink, marketing, Western region, Business Machines Group.

■ Wesley J. Hennessy and Bernard D. Loughlin are new members of Hazeltine Corp.'s board of directors.

■ George Toor has been elected vice president, marketing, by Wangco Inc.

Position Announcements

PROGRAMMER/ANALYST

A leading national consulting firm has an immediate opening for a computer programmer with experience in the transportation/urban planning field in Washington, D.C. Minimum requirements: college degree; 1-2 years programming experience; FORTRAN, COBOL or PL/I knowledge; JCL familiarity on any large scale computer system; operational familiarity with major transportation/urban planning computer packages. Desire a quick learner, with ability to communicate and willingness to expand computer language and hardware knowledge.

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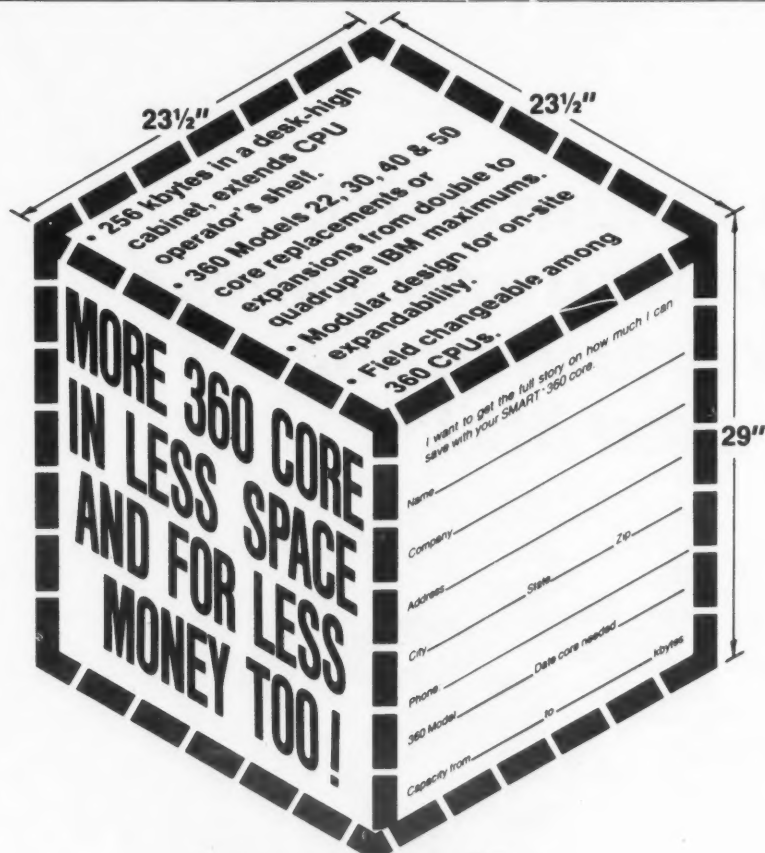
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SOFTWARE TEST — Experience in the analysis, design and/or implementation of software test procedures of large (real-time) DP applications. Analysis will include review of basic requirements test procedure requirements and evaluation of test procedure requirements as well as development of tools to support above activity. Knowledge of large DP Subsystem integration procedures desirable.

SIMULATION — Experience in the analysis, design and implementation of large digital simulations are required for the development of simulations of BMD systems. Systems to be analyzed include the requirements and design of Real Time Operating Systems, and BMD Applications Programs. Three to five years experience in large scale, real-time digital simulation is preferred.

OPERATING SYSTEMS — System programmers/designers/analysts with experience in CDC 6000/7000 hardware/software (or other comparable systems) and/or large scale operating systems are required to perform operating system analyses to include the review of requirements, design concepts, and testing utilizing software tools, e.g., simulations, where applicable.

SUPPORT SOFTWARE — Experience in the design, analysis or implementation of high-level problem oriented languages designed to support

- the automated construction of large real-time (non-real-time) software packages
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MDS Six-Month Earnings Decline, Reflect Rental Program Expenses

HERKIMER, N.Y. — Substantially lower six-month earnings at Mohawk Data Sciences, Corp. (MDS) continued to reflect the expenses of the firm's rental program with the System 2400 and KDS systems. Revenue, however, rose to a record \$68.5 million, of which \$39.1 million came from rentals and service income.

"While the staggering costs of expanding a worldwide systems sales and field service force continued to be expensed as incurred, the impact on current earnings is beginning to lessen now that a viable base of systems has been placed by our marketing organization," observed President R.P. Rifenburg.

"As a result of special marketing programs designed to enhance the order rates of our other rental equipment and systems," he added, "we are seeing additions to the installed base of these earlier lines and our total backlog reaching near-record levels."

"Furthermore, we have acceler-

ated our efforts for the outright sale of equipment and systems. These efforts have begun to bear fruit as evidenced in the recently announced Burroughs Corp. and AEC contracts valued at approximately \$5 million and \$4.3 million respectively," he added.

"We are completing the transitional phase of our development as a systems supplier which began more than two years ago. Our progress has not been without its setbacks nor has it always been evident in our financial results," Rifenburg stated.

Earnings for the six months ended Oct. 31 totaled \$301,000 or 5 cents a share compared with \$1 million or 18 cents a share in the same period a year ago.

Revenues rose to \$68.5 million from \$54.7 million in the same 1971 period, and included \$5.1 million from the sale of rental equipment to Randolph Computer Corp. under a previously announced agreement.

MDS has agreed in principle to acquire Elastolabs, a manufacturer of ink reservoir rolls, Rifenburg said.

Nickels & Dimes

Burroughs has declared a quarterly dividend of 16 cents a share payable Jan. 20 to shareholders of record Dec. 22.

\$\$\$

Dataflux, developer of a fixed read/write head for disk drives, has obtained \$200,000 from local private investors and completed an internal financial reorganization, which will enable it to begin immediate production of the units.

\$\$\$

Spectronics' total backlog reached \$1.8 million the end of September, up 139% from last year. The firm makes optoelectronic products and functional assemblies for peripheral gear. Earnings turned around to \$47,000 in the half, from a loss of \$60,000 in the same 1971 period.

Potter 1st Period Earnings Rise

PLAINVIEW, N.Y. — Potter Instrument Co., Inc. has started off its new year with earnings of \$141,000 or 5 cents a share in the first quarter ended Sept. 30.

This compares with a loss of \$49,000 or 2 cents a share in the comparable period of 1971, which has been restated to reflect various charges totaling about \$15 million taken for the year ended June 30.

Revenues grew to \$10.7 million from \$7.1 million in the year-ago period.

Orders from original equipment manufacturers continue to increase totaling almost \$11 million in the quarter, up 140% from the year-ago period, the firm said. This figure represents a 56% improvement over the immediately preceding quarter.

OEM sales for the period were almost \$6 million, 50% more than in the year-ago period.

In the year ended June 30, Potter decided to write down about \$9.7 million in deferred expenses on rental and service of equipment and also on R&D expenses.

Potter also reduced the book

value of rental equipment by about \$3.4 million, and made provision to write off certain obsolete and excess inventory, for about \$1.9 million before taxes.

As restated, the loss for the previous year totaled \$13.1 million or \$4.76 a share.

Datapoint Expects Quarter Turnaround

SAN ANTONIO, Texas — Datapoint Corp., formerly Computer Terminal Corp., expects earnings of about \$156,000 or 4 cents a share for the first quarter of fiscal 1973 compared with a loss of \$607,000 or 18 cents a share for the restated period of 1972.

Revenues skyrocketed to \$2.8 million from \$720,000 in the year-ago quarter ended Oct. 31.

Shipments of the Datapoint 2200 Intelligent Data Handling System have continued to increase, and accounted for 77% of shipments in the quarter, the firm said.

2260 DUCS 3270

We are pleased to announce the availability of DUCS-V (Display Unit Control System - Version 5). DUCS-V will currently support both the IBM 2260 Display Unit as well as the IBM 3270 Display Station in a local environment. The 3270 Display Stations are simulated in 2260 mode with no alteration necessary to the user's programs. The basic DUCS-V Program (2260 support only) is a licensed program product available from C F S, INC. for a monthly lease fee of \$25.00. The DUCS-V 3270 simulator feature is also a licensed program product available for an additional \$15.00 per month. The 3270 Simulator may be added to any DUCS-V System subsequent to the initial installation of DUCS-V without user re-assembly or linkage editing.

DUCS-VI will be available during the 3rd quarter of 1973. Version 6 will support both local and remote IBM 3270 Display Systems providing users with a convenient means of utilizing the enhancements of the IBM 3270 System.

Requests for DUCS-V should be submitted to C F S. License agreements, DUCS-V abstracts and other details will be sent by return mail. Inquiries may be directed to Mr. Richard K. Goran.



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Computerworld Stock Trading Summary

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CLOSING PRICES THURSDAY, JANUARY 4, 1973

E X C H		PRICE				E X C H		PRICE			
		1972 RANGE (1)	CLOSE JAN 4 1973	2-WEEK NET CHNGE	2-WEEK PCT CHNGE			1972 RANGE (1)	CLOSE JAN 4 1973	2-WEEK NET CHNGE	2-WEEK PCT CHNGE
SOFTWARE & EDP SERVICES											
O	ADVANCED COMP TECH	1- 3	2 1/8	+ 1/4	+13.3	O	TAB PRODUCTS CO	14- 23	22 1/2	0	0.0
A	APPLIED DATA RES.	3- 7	3 7/8	+ 1/2	+14.8	N	UARCO	21- 28	21 5/8	- 7/8	-3.8
O	APPLIED LOGIC	1- 4	2 3/4	- 1/4	-8.3	N	WABASH MAGNETICS	6- 11	7 1/8	+ 3/8	+5.5
N	AUTOMATIC DATA PROC	72- 99	90 5/8	+ 1/8	+0.1	N	WALLACE BUS FORMS	21- 26	24 5/8	0	0.0
O	BRANDON APPLIED SYST	1- 2	7/8	- 1/8	-12.5	COMPUTER SYSTEMS					
O	COMPUTER DIMENSIONS	4- 14	4	+ 1/4	+6.6	N	BURROUGHS CORP	147-229	224 1/4	+8 3/8	+3.8
O	COMPUTER DYNAMICS	1- 4	1	0	0.0	N	COLLINS RADIO	14- 27	25	+1 7/8	+8.1
O	COMPUTER NETWORK	3- 7	3 1/2	- 1/4	-6.6	N	CONTROL DATA CORP	43- 78	60 3/4	+2	+3.4
N	COMPUTER SCIENCES	4- 10	5 1/4	+ 1/2	+10.5	O	DATA GENERAL CORP	56-115	112	+2	+1.8
O	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0	O	DIGITAL COMP CONTROL	5- 25	5 3/4	+ 3/4	+15.0
O	COMPUTER TECHNOLOGY	3- 8	2 7/8	- 1/4	-8.0	N	DIGITAL EQUIPMENT	72-101	93 1/2	+3 1/4	+3.6
O	COMPUTER USAGE	7- 14	8 7/8	- 1/2	-5.3	N	ELECTRONIC ASSOC.	6- 13	8 1/4	+ 3/8	+4.7
N	COMPUTING & SOFTWARE	14- 28	14 1/2	+ 1/4	+1.7	A	ELECTRONIC ENGINEER.	6- 14	8 1/8	- 1/8	-1.5
O	COMRESS	1- 3	1 3/8	+ 1/4	+22.2	N	FOXBORO	23- 41	31 3/8	+2 7/8	+10.0
O	COMSHARE	5- 10	7 3/4	- 1/8	-1.5	O	GENERAL AUTOMATION	13- 49	48 3/4	+5 1/4	+12.0
O	DATATAB	4- 9	4 1/8	+ 1/8	+3.1	O	GRI COMPUTER CORP	2- 5	2 1/2	0	0.0
O	EDP RESOURCES	2- 8	2 3/4	0	0.0	N	HEWLETT-PACKARD CO	46- 88	87 3/4	+6 1/2	+8.0
A	ELECT COMP PROG	1- 5	2	+ 1/4	+14.2	N	HONEYWELL INC	118-170	135	+4 5/8	+3.5
N	ELECTRONIC DATA SYS.	43- 65	55 3/4	+1 1/4	+2.2	N	IBM	333-426	411 3/4	+26 1/4	+6.8
O	INFORMATICS	5- 11	5 3/4	+ 3/4	+15.0	O	INTERDATA INC	8- 16	11 1/4	+1 5/8	+16.8
O	I.O.A. DATA CORP	1- 3	5/8	+ 1/4	+66.6	N	MEMOREX	15- 38	17 1/2	+ 3/8	+2.1
O	KEANE ASSOCIATES	4- 7	3 3/4	+ 1/4	+7.1	O	MICRODATA CORP	5- 10	8 3/4	+ 1/2	+6.0
O	KEYDATA CORP	7- 13	10 3/4	0	0.0	N	NCR	29- 38	31 7/8	+1 3/4	+5.8
O	LOGICON	4- 9	4 5/8	+ 1/8	+2.7	N	RAYTHEON CO	27- 47	33 5/8	0	0.0
A	MANAGEMENT DATA	4- 10	4 3/4	0	0.0	N	SPERRY RAND	30- 50	49	+ 7/8	+1.8
O	NATIONAL CSS INC	8- 31	29 3/8	+2 7/8	+10.8	A	SYSTEMS ENG. LABS	7- 16	7 3/4	+ 1/2	+6.8
O	NATIONAL INFO SRVCS	1- 5	1 3/8	0	0.0	N	VARIAN ASSOCIATES	14- 22	18 1/2	+1	+5.7
P	ON LINE SYSTEMS INC	8- 28	24 5/8	+ 3/8	+1.5	N	WANG LABS.	23- 61	32	+4 1/8	+14.7
N	PLANNING RESEARCH	6- 17	6 1/8	0	0.0	N	XEROX CORP	121-172	152	+6 5/8	+4.5
O	PROGRAMMING METHODS	20- 25	24	- 1/2	-2.0	LEASING COMPANIES					
O	PROGRAMMING & SYS	1- 2	1 1/8	0	0.0	A	BOOTHE COMPUTER	3- 18	3 1/8	0	0.0
O	RAPIDATA INC	5- 27	23 3/4	- 1/4	-1.0	O	BRESNAHAN COMP.	1- 3	1 1/2	0	0.0
O	SCIENTIFIC COMPUTERS	2- 4	1 5/8	0	0.0	O	COMDISCO INC	3- 18	16 1/2	+3	+22.2
O	SIMPLICITY COMPUTER	1- 5	3 5/8	- 7/8	-19.4	O	COMMERCE GROUP CORP	5- 11	6 1/8	- 1/8	-2.0
O	TBS COMPUTER CENTERS	3- 6	3 7/8	+ 3/4	+24.0	O	COMPUTER EXCHANGE	1- 3	3/4	- 1/8	-14.2
O	TCC INC	1- 3	5/8	+ 1/8	+25.0	A	COMPUTER INVSTRS GRP	7- 14	7 1/2	+ 3/4	+11.1
O	TYMSHARE INC	7- 11	9 5/8	+ 3/8	+6.0	O	COMP. INSTALLATIONS	2- 5	2	0	0.0
O	UNITED DATA CENTER	5- 8	5 3/4	- 1/2	-8.0	N	DPF INC	5- 13	5 3/4	+ 1/8	+2.2
N	UNIVERSITY COMPUTING	9- 26	9 5/8	-1 1/8	-10.4	M	DATRONIC RENTAL	2- 4	2	- 1/8	-5.8
A	URS SYSTEMS	6- 10	8 1/4	+ 3/4	+10.0	A	DCL INC	2- 10	2 7/8	+ 1/2	+21.0
PERIPHERALS & SUBSYSTEMS											
N	ADDRESSOGRAPH-MULT	32- 49	33 1/2	+1 3/8	+4.2	A	DEARBORN-STORM	16- 26	22 1/4	+3 1/4	+17.1
O	ADVANCED MEMORY SYS	12- 23	16 1/2	+2	+13.7	O	DPA, INC.	5- 8	7 1/8	+ 1/8	+1.7
N	AMPEX CORP	5- 15	6 3/4	+ 3/4	+12.5	A	GRANITE MGT	5- 11	6 1/4	+ 3/8	+6.3
O	ANDERSON JACOBSON	4- 8	4 1/4	0	0.0	A	GREYHOUND COMPUTER	6- 11	6 1/8	+ 1/8	+2.0
O	BEEHIVE MEDICAL ELEC	1- 8	6 1/2	+ 1/8	+1.9	A	ITEL	7- 12	11 1/4	+ 3/8	+3.4
A	BOLT, BERANEK & NEW	5- 21	12	+ 3/4	+6.6	N	LEASCO CORP	17- 24	18	+ 3/4	+4.3
N	BUNKER-RAND	9- 14	9 7/8	+ 5/8	+6.7	O	LEASPCORP	6- 15	6 3/4	- 1/8	-1.8
A	CALCOMP	9- 25	12	+1 1/4	+11.6	O	LECTRO MGT INC	1- 4	2 1/4	+ 1/4	+12.5
O	CAMBRIDGE MEMORIES	9- 15	13 1/2	+1 1/4	+10.2	A	ROCKWOOD COMPUTER	2- 7	2 7/8	+ 5/8	+27.7
O	CENTRONICS DATA COMP	6- 28	22 1/2	+3	+15.3	O	SYSTEMS CAPITAL	3- 20	11 3/4	+1 3/4	+17.5
O	CODEX CORP	6- 25	19	+ 5/8	+3.4	N	U.S. LEASING	19- 34	33 5/8	+3 3/8	+11.1
O	COGNITRONICS	2- 5	2 5/8	+ 1/8	+5.0	EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE					
O	COMPUTER COMMUN.	1- 7	3 1/8	+ 3/8	+13.6	L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER					
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O	COMPUTER MACHINERY	7- 13	10 3/8	+1 1/4	+13.6	O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID					
O	COMPUTER TRANSCIVER	2- 9	5 1/4	- 1/8	-2.3	(1) TO NEAREST DOLLAR					
A	COMPUSET	3- 9	4	0	0.0	Computer Stocks Trading Index					
N	CONRAC CORP	24- 39	31 7/8	+1 3/8	+4.5	Computer Systems					
A	DATA PRODUCTS CORP	3- 7	4	+ 1/4	+6.6	Software & EDP Services					
O	DATA RECOGNITION	1- 5	1 1/4	0	0.0	Peripherals & Subsystems					
O	DATA TECHNOLOGY	2- 5	2 1/2	+ 1/4	+11.1	Leasing Companies					
O	DIAN CONTROLS	0- 8	4 1/4	+ 1/8	+3.0	Supplies & Accessories					
N	ELECTRONIC M & M	3- 8	5 3/8	+ 1/2	+10.2	CW Composite Index					
O	FABRI-TEK	2- 5	3 3/4	- 1/4	-6.2	Computer Stocks Trading Index					
O	GENERAL COMPUTER SYS	6- 16	5 3/4	-1	-14.8	Computer Systems					
N	GENERAL ELECTRIC	59- 74	72 7/8	+4 1/2	+6.5	Software & EDP Services					
N	HAZELTINE CORP	7- 13	8	- 1/4	-3.0	Peripherals & Subsystems					
O	INFOREX INC	20- 36	22 1/2	+2 1/4	+11.1	Leasing Companies					
O	INFORMATION DISPLAYS	1- 5	1 3/8	- 1/8	-8.3	Supplies & Accessories					
O	INFORMATION INTL INC	8- 25	14 3/4	+2	+15.6	CW Composite Index					
A	LUNDY ELECTRONICS	8- 14	8 5/8	+ 1/2	+6.1	Computer Stocks Trading Index					
O	MANAGEMENT ASSIST	1- 1	3/8	0	0.0	Computer Systems					
A	MILGO ELECTRONICS	15- 44	23 7/8	+ 5/8	+2.6	Software & EDP Services					
N	MOHAWK DATA SCI	12- 27	12 7/8	+1 1/4	+10.7	Peripherals & Subsystems					
O	ODEC COMPUTER SYST.	6- 12	5	- 1/2	-9.0	Leasing Companies					
O	OPTICAL SCANNING	6- 16	6 1/4	+ 3/4	+13.6	Supplies & Accessories					
O	PERTEC CORP	7- 17	8	- 1/8	-1.5	CW Composite Index					
O	PHOTON	6- 15	6 3/8	+ 1/8	+2.0	Computer Stocks Trading Index					
A	POTTER INSTRUMENT	7- 21	8 1/4	- 3/8	-4.3	Computer Systems					
O	PRECISION INST.	3- 13	3 1/4	- 1/4	-7.1	Software & EDP Services					
O	RECOGNITION EQUIP	5- 15	7 3/8	0	0.0	Peripherals & Subsystems					
N	SANDERS ASSOCIATES	13- 21	17 1/4	- 1/4	-1.4	Leasing Companies					
O	SCAN DATA	5- 13	4 7/8	- 3/4	-13.3	Supplies & Accessories					
O	STORAGE TECHNOLOGY	17- 39	33 3/4	+6 1/8	+27.1	CW Composite Index					
O	SYCOR INC	7- 11	9 1/4	+ 1/4	+2.7	Computer Stocks Trading Index					
O	TALLY CORP.	8- 15	11 1/8	+1 1/8	+11.2	Computer Systems					
N	TEKTRONIX INC	34- 64	49 7/8	+ 7/8	+1.7	Software & EDP Services					
N	TELEX	6- 15	5 3/4	0	0.0	Peripherals & Subsystems					
O	WILTEK INC	10- 26	17 1/2	+ 3/4	+6.4	Leasing Companies					
SUPPLIES & ACCESSORIES											
O	BALTIMORE BUS FORMS	5- 9	7 1/2	+1 1/2	+25.0	Supplies & Accessories					
A	BARRY WRIGHT	9- 14	12 3/8	+ 5/8	+5.3	CW Composite Index					
A	DATA DOCUMENTS	17- 26	21 3/4	+ 3/4	+3.5	Computer Stocks Trading Index					
O	DUPLEX PRODUCTS INC	8- 16	9 1/2	- 1/4	-2.5	Computer Systems					
N	ENNIS BUS. FORMS	6- 10	8 3/8	+1 1/4	+17.5	Software & EDP Services					
O	GRAHAM MAGNETICS	15- 27	19	+4 1/2	+31.0	Peripherals & Subsystems					
O	GRAPHIC CONTROLS	11- 15	12 1/4	- 3/8	-2.9	Leasing Companies					
N	3M COMPANY	76- 86	85 1/2	+3 1/2	+4.2	Supplies & Accessories					
O	MOORE CORP LTD	42- 57	56 1/2	+ 1/8	+0.2	CW Composite Index					
N	NASHUA CORP	48- 62	56 3/4	- 1/2	-0.8	Computer Stocks Trading Index					
O	REYNOLDS & REYNOLD	37- 77	48 1/4	+2 1/2	+5.4	Computer Systems					
O	STANDARD REGISTER	14- 20	18 1/2	+ 3/8	+2.0	Software & EDP Services					

Computer Stocks Trading Index

Computer Systems

Software & EDP Services

Peripherals & Subsystems

Leasing Companies

Supplies & Accessories

CW Composite Index

125

120

115

110

105

100

95

90

85

80

75

70

65

60

55

50

45

40

35

30

25

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10

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SEPT

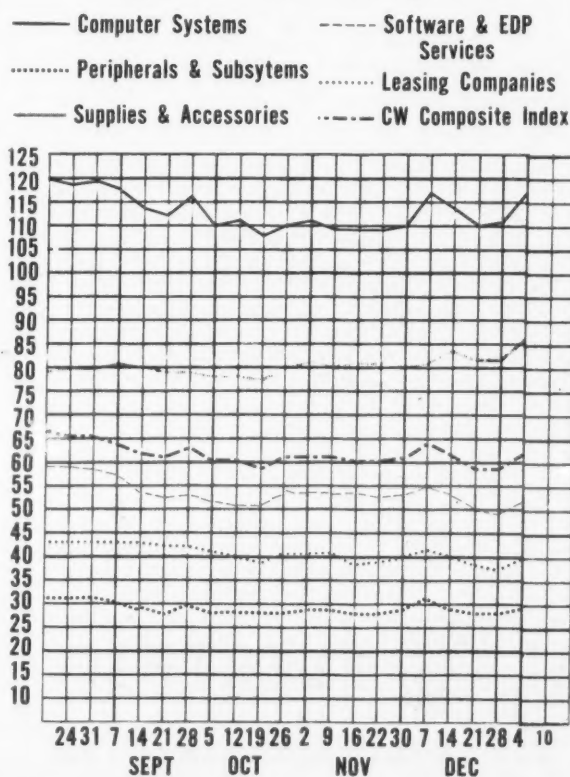
OCT

NOV

DEC

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BAIT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



Earnings Reports

BRADFORD COMPUTER & SYSTEMS

Three Months Ended Sept. 30		1972	1971
Shr Ernd		\$.13	\$.09
Revenue		8,878,077	3,165,115
Spec Item		c7,168	d(93,407)
Earnings		491,434	277,352
9 Mo Shr		.41	.23
Revenue		23,253,374	9,526,703
Spec Item		c69,311	d(485,528)
Earnings		1,416,557	736,242

a-Includes accounts of Bradford Shareholder Services in which the company held 82% of the common stock since Jan. 4, 1972, and accounts of BT Bradford Stock Services in which the company acquired a 75% interest in common stock April 4, 1972. b-Restated. c-Credit; tax credit less charge for conversion costs. d-Debit; charge for conversion costs less tax credit.

OPTICAL SCANNING

Three Months Ended Sept. 30		
	1972	1971
Revenue	\$3,464,190	\$2,204,993
Loss	49,961	501,895

GE's new Mark III gives you real control of time-sharing costs

If you think time-sharing is a good thing gone wild, we have a way to tame it. It's General Electric's Mark III.

Mark III is not just another time-sharing system, but a new approach to information processing. It's a single, unified service that combines the response of interactive time-sharing, the economy of remote batch processing, and the reach of a worldwide communications network.

Mark III has a comprehensive budget control system that lets you allocate computing dollars—by project, department, individual—tailored to your needs. It will automatically administer the allocations. And even give you daily reports at your own terminal.

Mark III not only helps you control costs, but actually reduce them. You can save one-half or more of your processing costs just by moving your time-sharing programs into remote batch operation.

Mark III is an integrated network of

nearly 100 interconnected computers. With a network this size, each computer performs that task for which it's best suited—communications, interactive time-sharing, or batch processing. The result is a service that can tackle all your computing easily, reliably, and economically.

General Electric was first to introduce time-sharing service in 1965. First to establish an international information processing network linking over 250 locations in North America and Europe. And now, with Mark III, first to put you in real control of your computing dollars.

If you're a Mark II user, Mark III offers you major new features and is fully compatible. If you're not, it's time to make a serious comparison of Mark III with whatever information service you now use. Take control. Phone 800-638-0971 or write us at 7735 Old Georgetown Rd., Bethesda, Md., 20014. We're ready to help.

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